Lectures

on the

Institutes of Physic

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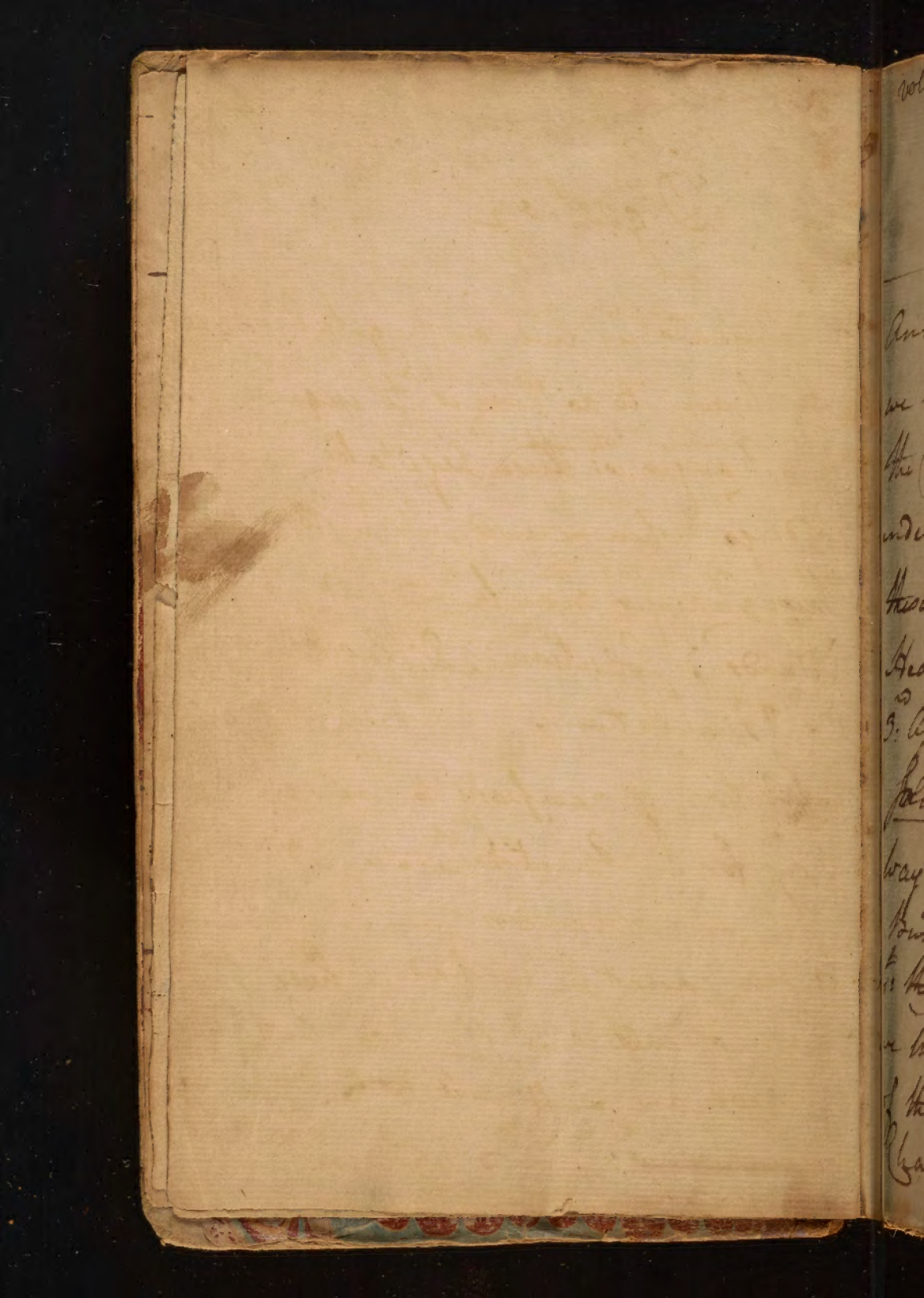

Digestion

Animals y: live on vegitables - all we have to do then is to enquire into the Changes wch these vegitable matters undergo when received into ye Stomach - these Changes may be reduced to three Heads 1 Solution 2 Diffusion and 3rd Assimilation.

Solution is necessary to prepare the way for the Operations wch succeed it. But some matters are so heterogenous yt they cannot be dissolved, here then we must call in Diffusion. but neither of these are sufficient to acc: for ye Changes wch ye Food undergoes, we

Digestion

must therefore call in Assimilation
Solution is performed by the Action of
the stomach - by its Heat - & by cer-
tain menstrua as the saliva, and
Gastric Juice and the Drinks we take in w:
are for the most part water. we shall
hereafter speak of the nature of saliva
under the head of Secretion. the Gastric
~~Liqu~~ Liquor appears to be secreted in
large quantities, & poured out into the
Stomach. to all these we may add the
mucus secreted in the Oesophagus. all
these Fluids taken together appear to
have no other Action than common
water. Agitation is necessary

Digestion

to promote this Solution in Order to dissolve the Matter to be dissolved. this Agitation is occasioned chiefly by a Peristaltic motion in the stomach. every Other kind of Agitation is trifling and dont deserve our notice. Another Assistance to Solution is Heat. some have supposed it to be a principal power. but this is false. it never exceeds 98°. such a Degree of Heat but little increases the dissolving power of water. a Degree of Heat above 98° coagulates Animal Matter, so y: it is necessary to call in a higer Degree of Heat y: we have.

the Heat of the circumjacent bodies can add nothing to the Heat of the stomach as they never exceed it by 1 Degree. Dr. Haller imagines ye the Heat of the stomach is encreased by its Orifice being shut during Digestion, but he is mistaken for no such shutting of the Orifice of the stomach ever takes place.

many Physiologists have supposed ye Digestion is carried on by this solution only. but this cannot be, for we find many Bodies are incapable of solution in the stomach.

neither can Friture alone have any great Action. I have known Pues, tard fud & even soap-pills discharged without undergoing the least change. Besides we never can by any Experim.ts w.ch Solution or Friture form a liquor y.t has any Analogy w.th Chyle. We must therefore call in Another power to Aid for Digestion viz: Fermentation. — This power acts by extricating Fixed Air from Aliment, & thus forwards its Resolution. take Notice here I do not suppose

Digestion

fixed air to be ye Cement of solid Bodies. the Attraction of Cohesion depends upon ye joint Nature of all ye Bodies which compose it, & not upon any One of them acting as a Cement to the Rest. a difficult Problem occurs here viz: is how are ye oily & watery parts of our Aliment mixt together? - I believe they are never mixt. - the Oil appears only to be diffused, even in the Milk itself which is formed from the Chyle. Some suppose the Saliva & Bile to be of a Saponaceous Nature

Digestion

Qy: May not the Oil & water of our Aliments, but deny these Fluids to be possessed of any kind of Saponaceous qualities, & which we ought to grand Qy: these words in y Animal Oeconomy.

In w: Manner are our Alimentary matters assimilated? — By Fermentation, This we prove 1st From the our Aliment being capable of Fermentation, & secondly undergoing it 2nd, from the Phenomena of Digestion, such as Fermentation & by the action of Air 3rd from the heat of the stomach &

Digestion

the air release in. how far does this Fermentation extend? - to the Acetous State. ~~this~~ does the Vinous State precede it? - we know this kind of Fermentation tends to extricate Mephitic Air, which we find is always extricated from our Aliment under the name of Mephitic Air. Is this Vinous Fermentation always necessarily previous to ye Acetous? - This I cannot determine altho it appears probable i^t omits being the common Course of fermenting Bodies.

2^d from a Fructuous breeding of Acetous Ferm^n

(a) See Dr. Ramsay's Experiments

(b) The Mephitic Air exhaled from the Lungs may arise 1st from a Fermentation or incipient Putrefaction going on in the Blood, or 2d from a mixture of the Chyle & Blood together.

Digestion

Dr. Haller mentions many Authors w^ch: I have not been able to read who all declare they have found an Acid in ye Stomach. all Patients when they throw up the Contents of their Stomachs, show the marks of an Acid in it. this Acid is destroyed by Mixing w^th: the Bile by w^ch: means the Bitterness of the Bile as well as the Acidity of the Aliment is Abtunded, & from this is formed that bland Liquor we call Chyle. this is Absorbed into the Lacteals. but how? Is it by Capillary or Electric Attraction? - Dis doceat - every Conjecture that has been formed, concerning the further Changes of ye Chyle is vague and uncertain. Cb.

Assimilation

How long does the Chyle continue before it becomes Blood? – Some suppose 12 hours. this they infer from the white Colour on Blood drawn from a Vein. – But this white Colour depends upon the Separation of the coagulable Lymph. It has no Connection w.th the Chyle. for my part I cannot imagine a Chyle is ever found in the Aortic System except in the Case of Secretion in the Mamma. It is probable the sanguification is not perfected in the Lungs, but I doubt whether Chyle ever appears after it has circulated once thro the Lungs.

Blood

This Fluid appears to be a homogeneous Mass, but Experiments teach us that it is a very Heterogeneous Mass.

— Blood when drawn emits a sensible vapour & the that looses a sensible portion of its weight. this portion differs according to the Degree of Heat, or the Quantity of Blood exposed. When the Blood concretes it forms a Gelatinous Mass, & after a while seperates into 2 parts. the One a solid red part, the other a fluid colourless part or sometimes a little yellow. the 1st is called Cruor, Blood Crassamentum. the 2nd Serum. —

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Blood

The Crassimentum is again divided into 2 parts. 1st red globules, 2nd a white tough gelatinous part called the Buff: Coat wch has long been supposed to be a morbid affection in the Blood. but it is constantly present, & may be demonstrated by pouring water on some Blood laid on a Cloath by wch means all the red parts of the Blood will be washed away, & the supposed morbid size Coat appears. Senac calls this part of the Blood coagulable Lymph. I shall distinguish it only by ye name of Lymph. the serum

Blood

appears to be Homogeneous, but Experiments teach us it is not. if we expose it to a certain Degree of Heat it coagulates like Lymph, & exhales a very volatile matter which exactly resembles the Balsamic we before spoke off. —

The Parts then y^t compose the Blood are 3. Red Globules — Lymph — & Serum, or 4th: I chose to call Ch=ter Mr Serac Serosity. I will call these the Constituent Parts of the Blood. Other matters may be Occa=sionally there. By what means is the Blood kept Diffused? By

Blood

Heat, hence we find the Seperation we before spoke off never takes place in a Degree of Heat equal to y^e^ of y^e^ animal body. The Halitus too, which exhales when the Blood is drawn, may tend to keep the Blood in a more diffused homogeneous state. The Circumstances of Drawing Blood likewise considerably influences its appearance. The larger the stream, & darker the bleed, the quicker the Seperation & vice versa. — This Experiment holds equally the same in all Inflam^y^ Diseases. From all this you see how little Dependance is to be placed on the Appearance of the Blood in enquiring into the

state of the Fluids. formerly the only attention was paid to the Blood, in Diseases, but from w: you have heard, you are I dare say fully convinced, how very fallacious such Observations must be.

The Red Globules are not mixed with the Lymph, but diffused only, hence the readiness they show to seperate when Heat & Moisture are withdrawn.

The Coagulable Lymph sometimes seperates from the Serum & red Globules even in the Body when their union is less firm than it should be, or when a sufficient Degree

of Heat to keep them united, is wanting or when a Substance is applied to it to which it has a stronger Attraction than to the red Globules. hence we find if an Artery is deprived of its Pulsation the Lymph is more strongly attracted by its, & thus constitutes Polypus.

— the Spontaneous stopping of Hæmorrhages depends upon ye same Cause. viz: the Lymph coagulating & forming a Thrombus round the Bleeding Artery.

The Serosity is of great Fluidity. — is very volatile, & by its greatness Super Evacuate favours the Conversion

of what is left behind. hence the quantity of Crassimentum obtained in Bleeding will depend upon the circumstances w: influence the Separation of the Serosity, such as Heat, broad vessels &c.

The Separation of the Lymph likewise depends upon several Circumstances such as the Stream - the Degree of heat - the Agitation it undergoes - the Form of the vessel in w: it falls - together w: the Matter of w: the vessel is made. The Separation is easiest and quickest in Earthen vessels. even in those Cases where the Lymph is dense, & formed into a little hollow

of the Blood

floating Island, & where it spreads over the whole vessel it is less dense it depends entirely upon the Circumstances of drawing - Cooling &c we before spoke off. - I have seen both these Appearances of the Blood within these five weeks in a Rheumatic patient whose Blood I was sure could not be changed as it was drawn at such short Intervals.

We shall now speak more particularly of each Constituent part of the Blood.

1 The Red Globules were supposed by Lowenhoek to consist of Glyser Globules on w.h their Colour he imagind

depended. This Notion is so erroneous y: I need not take any time to refute it. The 1st Question y: occurs here is Why do these Globules continue separate? Why because they are not miscible w: any other parts of the Blood. — thus we find Alkohol & Caustic Alkali will never mix tho' agitated ever so long. Some suppose the Reason why the Red Globules do not mix w: the other parts of the Blood is because they are of an oily Nature. But surely no Oil can prevent the Union of the Alkali & Alkohol we before spoke of. to me they appear to be of an

aqueous nature. this I infer from their being so easily washed away from the Lymph by water, & from ~~their~~ their being so diffusable in water. was it Oil we can ascribe these Phenomena w.ch never take place. Nor do ~~it~~ their inflamable nature, nor yet their dissolving when heat over the fire prove them to be Oil, many things, y.t contain no Oil burn notwithstanding very readily & are easily dissolved by Fire. See 3478 & two following paragraphs of Dr Gaulin's Pathology upon this subject. What is y.e Specific Gravity of the red Globules?

of the Blood

I know of no Experiments that ascertain this, as Other parts of the Blood are so diffused with them. An w: does their Colour depend? — this is as yet unknown to us. Dr Lenat imagines y Colour depends upon 2 or 3 Globules being laid together each of wch are colourless when separate. But here he assumes y: the Red Globules are lenticular wch we cannot admit. I grant indeed the greater or lesser Colour of the Blood depends upon y Degree of Concretion in the red Globules. Some

of the Blood

we find the Bottom of the Basson of Blood has the deepest blackish Colour w: is owing to the Globules coneretting more closely. this was formerly Attributed to its not being in Contact w: the Air, but we are now Sure this is not ye Case. The Difference of Colour then in the Blood depends entirely upon the greater or lesser Seperation of Serum from it. The Difference of Colour in the Arteries & veins depends upon the same Cause. the Blood in the Arteries is more agitated & hence its more florid Colour,

of the Blood

While the Serous Blood is less agi-
tated it is moreover deprived of much
of its thin serous parts, & hence arises
its deeper black Colour. This difference
of Colour has likewise been attributed
to the Action of the Air on the Blood,
but I think the Solution we have given
of it accounts for this difference of Colour
much better. But again, we know y:
Neutral Salts w: thin & dissolve the
Blood encrease the florid Colour, while
Mineral Acids coagulate it & press
out the Serous parts of the Blood, & thus
give it the deep black Colour. even

the vegitable Acid has these coagulating Effects altho' many suppose it tends rather to dissolve the Blood. thus far we admit Mr Lind's Opinion, but we can not admit that diffusing the Blood deprives it of its Colour. Dr Haller deserved to be consulted on this Subject. — I wish I could inform you from whence this red Colour is derived, & in w: manner these Globules are formed. they are generally proportioned to the Action of the vascular System. in w: manner do they pass away? this we cannot tell. we are sure in a healthy Body

of the Blood

they do not pass away in their natural state. they appear to be more disposed to Putrefaction than any other parts of the Blood, & when putrefied they may mix with the Serum, and thus pass out of the System? but all this is only conjectural. What is their Use in the Body? perhaps to keep the Lymph diffused which we know is very much disposed to concrete. they may likewise assist in Secretion in retaining the less fluid parts of the Blood. further the Growth & Elongation of the System may

depend upon their action especially as we find them confined only to the Blood Corpuscles.

2.nd Coagulable Lymph. It is not easy to take this portion of our Fluids by itself. it generally contains a quantity of Serum. hence our Experiments upon it must be uncertain. however we have a Fluid analagous to it on which many Experiments have been made viz: the Albumen Ovi. ~~[illegible]~~ both these Fluids are coagulable by 150: of Heat - both by Acids & Alkalies in like Quantities & in like Manner. they

of the Blood

only differ in 1st: the Albumen Ovi is more bland than the Lymph which is owing to the latter containing some saline parts of the Serum. 2nd: the Albumen Ovi never concretes in the Cold which is owing to its containing a greater quantity of Water mixed with it — if Albumen Ovi is dried & afterwards mixed with Water in the Heat of the Body it is diffused, but in the Cold it concretes like coagulable Lymph. upon the whole then I think they are exactly the same. they are both of them the Source of Nourishment. all Vegitable

matter are first formed into Lymph, wch: after a while is dissolved in the water we take into our Bodies, & is then called 3rd: Serosity. This appears to be nothing but water wth: Salt dissolved in it. This Salt wch: it contains is of ye Ammoniacal kind, the Alkali of wch: is ye same wth: all other Volatile Alkalies, but its Acid is of a peculiar nature, and has been called the Acid of Urine, or the Acid of Phosphorus. But how is this Acid formed? & what is its use in ye Animal Oeconomy? ~~& Is~~ does it arise from a Degeneracy of our Blood?

of the Blood

all these are Questions we cannot pre-
-tend to answer. I am apt to think
it is not a morbid Phenomenon. I
imagin it may tend to dissolve the
Lymph so as to form the Serosity, as
also to keep the whole mass of Blood in
a fluid dissolved State.

One Question arises here & that is
w^h is the Proportion wch each of these
parts of the Blood bear to one another?
- many have attempted to explain
this Questions but I think wth little
Success. It differs in different Constitu-
-ons & in different States of the Body. If

of the Blood

is moreover very difficult to procure each of them in a seperate state so as to are they to be diffused wth each Other. Lac

The Red Globules appear to be in ye smallest proportion. I know of no Experiments that ascertain the proportion of ye Lymph & Serosity. the Lymph is in a large Proportion wth Regard to the Red Globules. it would be of little Consequence to us if we knew their Relative Proportions to each Other, as we could not tell when this Proportion was destroyed in Diseases.

What Other Matters are contained in the Blood? some suppose the

of the Blood

Chyle ought to be considered as a part of the Blood. But the Evidences of ye Presence of this Chyle in the Blood are not satisfactory. The Notion of its prevailing in the Blood arose entirely from an Ignorance of the Nature of the Blood. Coagulable Lymph has Likewise been mistook for it. I will still however allow that Chyle may be present in our Blood altho' it is not observed by our Lenses. but of this we shall speak more hereafter when we treat on ye Milk.

Our Fluids wch circulate in the Blood-vessels may be divided in 5. parts

1st Aliment not quite assimilated

2 Albumen, or coagulable Lymph.

of the Blood

3 Albumen tending towards Serosity.
4: Serosity, strictly so called.
5 Red Globules.

To these 5 parts Dr. Lunac adds 2 more. viz a Gelatinous & Mucous Part. But I know of no Experiments that show us any thing like a Gelatinous Matter in the Blood. I therefore conclude he infers its Existence only from Theory, viz: from the Nature of the Solids which are gelatinous when resolved, & which are formed from the Blood. Besides even the Gelatinous Matter of our Solids is procured only by a Decomposition of their constituent parts, & does

of the Blood

not appear to have preexisted in the Solids. There appears to be more Foundation for the Mucosity he talks of, especially when we see how much it abounds in our System, - But notwithstanding we have no Experiments that prove its Existence in the Blood. It appears to be the product entirely of Secretion. Dr Haller endeavours to support this Opinion by saying that we take a large Quantity of Mucus in our Aliment. but this proves nothing. for it must certainly undergo the common Assimilation of all Other Aliment. Dr Senac makes use of Another Argument to confirm his Supposition. that is,

of the Blood

If you press the Stomach of a dead Animal you may squeeze out more Juices from it $\frac{n}{y}$ can be supposed to be contained in its Follicles. But 2 Objections may be made Ag: this. 1: we cannot pretend to ascertain the exact Size or Capacity of the Follicles of the Stomach & 2: supposing it pressed out in ever so great a Quantity it never could have existed in $\frac{y}{e}$ state in the Blood, for all Secreted Matters are remarkably thin when first poured into their secretal Glands, & have scarce any Resemblance to $\frac{y}{e}$ Cream in w: they appear after stagnating a While.

But What shall we say to the

Presence of Oil in the Blood? we certainly take a great deal of it into our Aliment, & know of nothing in the Fluids of our Body that is capable of mixing it with the Blood. But still we have no proof of its existing formally in the Mass of Blood. the Facts Dr Haller adduces in Support of this Opinion are very few & not well attested. for my part I have never seen any thing in the Blood yet had the least Resemblance to oily Matter. I grant there is a variety of saline Matters present occasionally in the Blood from Medicines & other things taken into the Body. these saline

Matters are ordinarily dissolved in y Serum, but wth the Chiefe nature of these Salts is no Experiments have yet determined.

One more Question occurs here, & that is, does our Blood contain Air? - Air we know enters into y Composition of all Bodies, and is then said to be in a fixt State. But our Enquiry here is whether Air is present in an Elastic State in our Fluids, or in an intermediate State between a fixed & Elastic State? - I think we have Reason to presume it is often present in

of the Blood

in an Elastic state, but always in a half fixed state. Water contains Air in a semi-Elastic state. This we prove from taking off the pressure of the Atmosphere in an Air pump. Now Imagine it is present in the same Degree in Animal Fluids. This is proved from the Air extricated from them by Putrefaction. It is taken in by our Aliment in great Quantities in a fixed state. we cannot tell in w^h manner the Air escapes from the Fluids. May it not be from ye Lungs? — the Air in the Chyle is ye most Elastic.

of the Blood.

It becomes less so in the Blood, but loses all its Elasticity in some of the Secreted Fluids more especially in the Urine. This would make us believe that ~~the~~ the Air was losing its Elasticity in the Blood. But we find it in an Elastic state in the Milk - Bile - and Saliva which may seem to favour its being rendered Elastic by the System. Upon the Whole, the Subject is dark, & as yet we can say nothing precise upon it. There is one part of the Body in which Lungs to contain Air in an Elastic state necessarily, viz the Cellular Membrane. this is proved

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from Emphysema's. Mr. Senac says air is to be found in every Cellular Membrane in the Body. I think it appears to be highly probable that there is a Secretion of this air from the Fluids wch is poured out in the Cellular Membrane, & that many Diseases not yet described may arise from a Seperation or a want of a due Secretion of Air. this then finishes our Acc: of the Blood, or circulating Fluids. all the other Fluids of ye Body are formed from them by Organs provided for that purpose. this Function

is called Secretion which appears to be the most considerable function of the Animal Oeconomy, and I am sorry to add One that we understand least about. By Secretion we understand Fluids prepared from a Heterogeneous mass of Fluids by a kind of Colation. — a Question Occurs here in the first place & i e did the secreted Fluid preexist before in the blood? or are they formed by a new mixture? as to the first of these we have sufficiently rejected it when considering the constituent parts of the blood. thus far we may allow it to be true, that the

Fluids we exhale from every external & internal part of the Body, together w.th the Urine & Sweat appear to be pure Serosity. we have several Exp.ts which establish this Relation. These Fluids then strictly speaking are said to be secreted, that is they pass off thro' Vessels w.ch refuse a passage to other parts of the Blood. But no other secreted Fluids of the Body have anything that resemble them in the Blood. no One can have any suspicion of the Presence of Bile in the Blood or of the Cerumen Auricum before they are secreted. ~~Other~~ Some suppose it secreted

Fluids exist in the Blood in those parts wch constitute them ~~thus the~~ ~~be~~ by Mixture when they arrived at the Glands. thus Dr Boerhaave makes the Bile to consist of Oil. Alkaline Salts &c Absorbed from ye Omentum & Coeco. But this is contradicted by many Facts. upon the whole then conclude there is no Foundation for ye Opinion of secreted Fluids preexisting in the Blood. We must then look ~~for~~ to the Organization of the Glands to accn for Secretion. We must reduce our Fluids to 2 kinds 1 Oily & 2 watery. The watery parts of our Fluids may

(c) This is remarkable in ye Blood in an Ischuria Renalis, in wch Disease even ye pores have poured out Urine.

Secretion

be divided into 1st Lymph 2nd Mucus
3rd such as are impregnated with Saline
Matter viz: Urine (a) & Perspiration.
the Oily Matter are more difficultly divided
— perhaps the Milk may arise from it.
— But I cannot conceive of Bile or of
Cerumen Aurium arising from it.
we must then resolve their Formation
to the Nature of the Secreting Organs.
we have no Observations yet shew us the
Presence of Bile in the Blood in an
Obstruction of the Secretion from
Schirrosity or Inflamation. we
must then allow that it is formed
in the secretory Organ itself. we see

Secretion

something analogous to this in Plants
viz: from one general Fluid are capable
of secreting 4 or 5 different Juices. Wh:
is the nature of the secretory Organs
y: gives them the power of forming
such Fluids? - this is a most difficult
Question. Some of the Glands consist of
a Series of decreasing tubes. Others have
Follicles interposed between y secretory
& excretory vessels. But we must attend
to the first structure only in accounting
for Secretion, for the Fluids are always
secreted before they are poured into
the Follicles. Shall we call in y
Difference of Aperture ~~to Bud~~ in secre-
-tory

vessels to act for Secretion. hence the Reason why the Secretions in Children are different from what they are when they grow up. But 2d we find the Secretions altered by affections of the Nervous System which tend either to contract or enlarge the Apertures of the Glands. This is evident in the limpid pale Urine which follows a Spasm on the Kidneys in an Hysteria. 3d we find the Secretion changed by encreasing the Imbetes of the Blood wholly proper Matter has Pass more Glands than ordinarily do, the Red Globules &c. furnish a strong Argument in Favour of Secretion depending on the Diffusion of Apertures

4th: we find in Cases of Injection the
wax is often injected without the
red Tincture wch: shows us a kind of
Secretion. But all these Arguments pro-
ceed upon a Supposition of ye secretory
Fluids preexisting in the Blood. Physiolo-
gists have therefore called in Other Hypo-
theses. Winslow supposes yt: the
secretory Vessels are originally endowed
wth: a power of admitting one sort of
Fluids & repelling Others, but this is
overthrown by wch: we see in ye Case
of Bile wch: when diffused in ye Blood
passes thro ye Kidney, Salivary Glands &c.
— Some Other powers of Nature &

Secretion

Fermentation must be called in to aid for Secretion as well as the mere Structure of the Glands, especially in those Cases where Follicles take place. Altho' we have no Instances of Fermentation in ye healthy Body yet we have in the diseased. Pus appears to be formed from Serum secreted from the Blood wch is afterwards changed by a Fermentation sui Generis. — See Mr Gaber's Experiments.

# of Nutrition.

This subject comprehends whatever relates to the Support of the Matter of the Body. It may be divided into 2 parts 1st the Support of the fluid parts & 2 into the support of the solid parts of the Body. The 1st depends upon Aliment being taken in to ye Body & converted into Nourishment in the manner we have before described when speaking of the Chylopoeis & Haematosis. I shall therefore only speak of the Nourishment of the Solids. we shall 1st enquire what part of the Fluids are applied to

Nutrition

Nourish the fluids, & in what manner.
— this Inquiry again divides itself
into 2 parts 1st how Growth is promo-
ted & 2nd how a waste of the solid parts
is repaired after the Growth has ceased.
— I shall begin with the 1st Question in wh.
manner the fluids are applied so as
to give Growth to the body. You see how
much this Question is connected with the
Organization of all animal & vegetable
Bodies in general. But as this subject
admits of no Application in Physic I
shall pass over it. I only observe that
I adopt the Doctrine of Stamina wh.

Nutrition

appear evident from the Body into Growth showing marks of an Evolution of parts previously delineated. Altho' the Stamina of some parts of the Body did not preexist such as the bones yet such a Nature is originally given to the parts contiguous to these parts ye did not preexist as to determine precisely the Form of all Matter applied to it. see this subject more fully discussed by Dr Haller.

I shall consider Nutrition in the following manner.

1st w^t is the proper Nutritious Fluid.

2nd Where this Fluid is separated from the Blood?

3^d In w^t manner is it thus separated & how conveyed to ye smallest Fibres every where.

Nutrition

Qd 4th How the Fluid wch nourishes is applied so as to give Extension & Growth. The Subject is dark, & all we can hitherto to it, to offer some probable Conjectures on it.

1st W is the proper Nutritious Fluid? — I have said before yt this is ye Coagulable Lymph. This I infer from its Resemblance to the Albumen Ovi which we know is the only Nourishment of the Chick. It is always present & in great Quantities in the System. it is originally formed from our Aliment wch shows its great use, & absolutely necessary presence in the body.

Nutrition

- But I infer its being the nutritious Fluid chiefly from its Resemblance to the Albumen Ovi wch differs from it only in being a little more Fluid & w: may have been the work of Secretion in the Vessels of the Chen. From this it appears that Nutrition is not performed in the larger Vessels, nor have we any Reason to suppose a secretory Apparatus is provided at the Extremities of the Arteries to give the System a proper Degree of Fluidity. Some Apparatus I grant is necessary to change the Lymph into Albumen or proper Nutritious Matter. This many Physiologists

Nutrition

have supposed is performed in the cortical part of the Brain, & hence they have supposed the Nerves to be the Secretories of this nutritious Fluid when secreted, to all parts of the Body. See this enunciated more fully in Dr Boerhaave's Institutes §440-446. – This Doctrine has prevailed for near 150 years in the Schools of Physic. Dr Haller is the first Who has opposed it, we shall briefly detail his Objection to it, as I am enclined to embrace Dr. Boerhaave's Opinion. – my 1st Argument in Support of Dr Boerhaave's Opinion is 1st: the Brain is a Gland & 2d: the Nerves are its excretories.

(1) The first thing observed in an Embrio by a Microscope is the Brain & medullary Fibres.

Nutrition

— the structure of the Brain is evidently a Gland of the Ruegelian structure but I shall rest my Opinion upon other more substantial proofs. 2nd Dr. Boerhaave has proved y: an Inelastic Fluid is secreted in the Brain, now we before proved it could not be designed for Sense and Motion. it must then be designed to nourish the Body. 3rd the Nerves are the original Stamina of an Animal Body & all Nurishment is applied to them Stamina, from w: it follows y: the Brain & Nerves are necessarily employed in Nutrition. 4th every part of the Body appears to have been either Fibrous

1a. Dr Haller tells us y: upon macerating the brains they appeared to be cellular but he forgets y: maceration may have destroyed their texture. Dr Haller himself confess y: the Bones are formed from fibrous stamina. this is to order that it may be seen y Cranium — if it ever disappears it is owing to matter being effused w: which obliterates the fibrous structure: the Pericr

or Cellular originally. the Cellular parts appear to be formed by an After Accretion. this is sometimes evi-dent to our Eyes, & is proved from the Phenomena of many Diseases. It is always in a determined Quantity in all Animals of the same Species. this only can depend upon Staminal Fibres directing its Arrangement. But w: shall we say to the brains? they have some tetz & no Fibres but are cellular. but negative proofs avail nothing. we find a Fibrous structure in the Dura Mater w: is capa-ble of forming a Cellular Appearance from w: it appears highly probable y: the brains are Originally Fibrous.

we know were one Muscular, & were possessed of Sensibility & Irritability but by age were then both together with their fibrous appearance, yet surely no Man will deny their being originally fibrous.

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this answers the first & 2nd questions we proposed & in some measure the 3d. for if it is secreted in the Brain it is highly probable it is conveyed to all parts of the Body by the nerves. But I go on w: the Arguments I began with. 5th the only Fibrous parts of the Body we observe are the nerves. no One I think has denied their fibrous structure. they all terminate in muscles w: ch I formerly said were always Fibrous. Dr Haller disposes that the Growth & Extension of the Body together w: th the Evolution of the Fœtus depends upon y e Action of the Heart & Arteries. But the

Action of a Brain & a Nervous System is Absolutely necessary to account for the first Action of the Heart & Arteries. — There are late Observations by one M. Lionis w: show us that the Animals are originally in a Vegitable State. & first thing it evolves the Germen of Plants is Heat, & we can not conceive of the Operation of Heat first on a Nervous System. The Nourishment of Vegitables depends on a Nervous System they contain of Fibres distributed in an Analagous Manner to the Distribution of Nerves in an Animal Body. It is no matter how whether the

(a) By Injection here we are to un=
=derstand Coulour Liquor so placed
on the Roots of Plants that they Abor=
=bed them.

Fibres are tubular or spongy. this does not affect our Question. the Fibres do not ramifie, but proceed in strait Lines like nerves. they have lately been injected by colour'd Liquors which always appeard in distinct separate Lines. when they appear to ramifie they only split into lesser Fasciculi. Moreover by maceration they always seperate into distinct Fibres. upon the whole no Observation shows us any Analogy between the nerves of plants and the vessels of Animals. we have

no Observations that tend to show any Analogy between the Blood Vessels of Animals & the Vessels of Plants.

All Plants Spring from Original Stamina which may be seen by opening a Germen more especially their Leaves. But I return to apply this to our present subject. Every Year there are Layers accreted to the Tree from the internal Surface of the Bark. This is proved by cutting a piece of Bark out of a Tree & putting a piece of tin foil on it, & then shutting the Bark over it again, & tying it closely to the Tree. if we examine this tin foil some Years

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Afterwards we shall find it sunk pretty deep into ye Substance of the Tree.

If we examine the internal structure of the Bark of Trees we always find it Fibrous. all the Cordage used in Ship Building is procured from this part of Vegitables. Every Year the Tree receives a Layer of Fibres from the Bark which may be seen in the Spring of the Year. I grant there may be a great Accession of cellular Substance to the Trees as in the Fruit, but this arises from Original Stamina.

from all this I conclude the Form & Growth of Plants depends entirely

upon a fibrous structure. The use of make of this very beautiful analogy is to prove that the nourishment of Animal bodies likewise depends upon Nervous Fibres. I do not pretend to say whether these nervous Fibres are hollow tubes. We have no proof that the tubes of plants are hollow, but on the contrary that they are of a spongy structure. If those Fibres then transmit nourishment to plants, may we not infer that the nerves convey nourishment in a like manner. even supposing the vessels of plants are tubular

yet we know of no power capable of moving Fluids in them. Capillary Attraction acts as well in a Spongy Fibre as in a hollow Tube. the Fibres of Plants have a subtile Fluid in them: which we know from their being susceped of Irritability in Consequence of the Action of external Bodies on them. I choose to call it Irritability to distinguish it from Sensibility which more properly belongs to Animals. Electricity we see promotes the Growth of plants almost to the Eye. Light which shows us the presence of some fine Ether in them. So that

yon Ca Plants are possessed of a Nervous System on w: their Nutrition & Growth depend. and if this is the Case in plants we may venture very confidently to say something Analogous must take place in Animals.

However plausible this Theory may appear Dr Haller has raised Objections to it in the 8th Chapter of his 10th Book.

I do not argue from Cause & Motion ceasing in Paralytic Diseases. the shrinking arises from a Diminution of the Fluids. we have no proofs of y. Solids being lessened in Consequence of a Paly. Nutrition appears to go on as

well as con. the Shrinking of the Limb affected w: Paralysis is easily re=
=moved by restoring their Blood to them.
— so that Dr. Haller need not have been at the pains of refuting this Argument.
2d: He supposes the Fibility of ye Bones is so great that the Nourishment passing thro them w: be too fluid to convey the Nourishment of the Bones.
but this is no Objection. it may carry solid matter with it w: it deposites ye solids. the Liquor w: forms ye shell of Snails is exuded thro its Body when it consists in a fluid state.
— Silk — & a Spider's web were originally very fluid, but become hardened. by

Exposure to the air. the shell of an Egg every Body will confess warm fluid, but how hard does it become when exposed to the air! In ye same manner there is an Obscure Matter in our Nourishment! the liquidity then of the nourishing Fluid is no Objection to its passing thro' the Nerves. nor are the Nerves too small to admit of this Nourishment for I do not maintain that it is the Medium of Sense or Motion. on the contrary I maintain that these both depend on a Subtile Elastic Other w: is familiar to the Nerves.

3d: He says there are many animals wch: live & grow that have no nerves, & that there are some parts of the body wch: have no nerves & yet are nourished. But this is no Objection the 1st is evidently false, & whenever we see animal matter without nerves we must consider it as cellular substance effused and acreting to fibres.

4th: He says the greatest viscera have very least nerves as the Liver Lungs &c. But he mistakes their Bulk by including their Fluids to wch: they owe their size. for my part I think the

solid matter is exactly proportioned to their Nerves, in ye same manner as the parts of the Body

5: He says there are Cases of Atrophy without a Loss of Sensation. This may easily be accounted for from w: we said before. The Other of the Nerves may continue to transmit Sensations after the passage of the Nourishment thro them is Obstructed.

This finishes our Ac: of Dr Hall's Objections. I do not think them of any Force, nor am I induced by them to desert my Opinion, but on the contrary am more confirmed in it.

3rd: In what manner is this nourishment thus separated & transmitted to the solids applied to them? this is a most difficult Question. it is not enough that we have found out nourishment is applied to our solids, we must now enquire how it is applied to them. & here we must again call in the Analogy of Plants. it is a well known Fact that if any common vegitable is brought into a warm Room in the dead of winter vegitation imediately appears in it. this has been attributed by botanical Physiologists to Heat

promoting the Circulation of the Sap from the Root up thro' its Branches. - But if the same plant is placed behind a hot House in such a manner as y: one of its Branches can ~~insinuate~~ insinuate it: self into a window in the hot House all the marks of Vegitation appear in this Branch while the rest of ye plant remains dry. How shall this be accounted for? here the Heat could not act so as to promote ye Circulation of the Sap from the Root, it must then depend upon Heat or some other power to put the Vegitable into a Condition fit to receive an Aurora

viz: the power is It is not to our purpose to inquire. But in Animals the Growth of the solids depends upon the Action of the Heart extending them. hence we always find Growth proportioned to the Action of the Heart or the Distend: power of the Blood. those parts grow most where the Impetus of the Blood is greatest, hence the great Size of the Brain viz: in Infants is never proportioned to the rest of the Body. the more lax & patent the vessels in any part are the quicker & greater the Growth of those parts viz: where the vessels are distributed. this in a few words every

serve to evolve the formation of the Animal System. From this you may easily comprehend the Reason why the Body continues to grow till the Solids & Heart are in an exact Ballance w: each other so that the former resists the extending power of the latter.

But before we enquire into the Causes to stop Growth let us enquire into the Formation of the Bones. These early appear in the Original Stamina they are at first soft & gelatinous, but they then become so hard as to show little Flexibility. during their soft state they are colourless but

as they become Cartilaginous they appear yellow, & when they become hard or Bony they evidently show red Vessels wch may be seen 1st in the Middle of long Bones & in 2d Centre of short Ones gradually extending themselves towards the Ends & Circumference of the said Bones. These Blood-vessels proceed in right Lines wch is obvious to our Senses. From these Facts it will appear that the powers of 3d Circulation must be called in to Aid for the Formation of Bones. the Matter of the Bones is Diffirent from the Matter of the soft parts. It

Nutrition

is in the state of an Alkaline Earth & dissolves into a Neutral Salt by Acids. We have no Matter in ye Soft parts analogous to this. This Osseous Matter is deposited in separate Cells of the cellular Texture & may be washed out from them before it becomes so hard as to Obliterate the Cellular Texture. See Dr Hallen on this Subject who has fully proved a Succus Osseus. The only Question yet now remains is how it is formed? — the two Impulses we speak off tend 1st to give a Due Extension to ye Bones & 2nd to pour forth the secreted Osseous Matter into ye Cellular membrane

which is formed on nervous fibres. Callusses are formed from an extension of the Periosteum & are evidently organized parts, & do not depend upon a mere Effusion of bony matter. The Reason then why growth ceases at a certain age is owing to the Force of the Heart no longer being able to propel the blood in the Bones so as to cause them to send forth fibres. – In all Cases of wounds where new flesh is formed a Inflamation must be excited in the Nerves so as to cause them to throw out more Nutritious matter to fill up the cellular Texture which has been produced. This cellular Substance

is formed by the nerves w.h I infer from its great Sensibility. the Extensile power then of the Heart makes way for the nerves to pass out & to form this Cellular membrane. this Cellular substance may be so involved w.th new Matter as that its Sensibility may be destroyed unless an Inflamat.n is induced upon it by certain Causes. The Heart does not increase in proportion to y.e rest of the System, & hence our Growth is limited. the substance of the Bones becomes hard by Age so as to obstruct the Blood Vessels they contain, hence a Resistance is produced to the Heart.

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I shall now briefly recapitulate what I have said of Nutrition.

In every part of the Body there are Nervous Fibres viz: are the Original Stamina of the Body but formed in such a manner as to admit of an union of cellular Membrane. this I think sufficiently proved 1st from Analogy of Vegitables 2nd from Formation of Bones & 3rd from the Production of Callus. — I do not pretend from this to explain all the Phenomena of Nutrition this may follow afterwards. the Growth of the Body I said depends upon the

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Action of the Heart, but to this we must add Compression which has some Influence in determining the Form of the Solids. I do not pretend to say why the Force of the Heart's Action does not encrease in proportion to the Rest of the Body. we are sure of the Fact, & this is sufficient for our purpose. Growth is always greatest in the Beginning & least as it approaches towards its Acme. It is not uniformly the same in all parts of the Body which we said depended upon some Vessels being more lax & patent than Others. This Disproportion is most Manifest in

in the Head wch: horse first arrives at its Acme. hence the Reason why the Effects of a Disproportion between the Fluids & Vessels so often appear in ye Head such as Haemorhages - Serous Defluxions &c wch: are always prevalent to young Children. When the Ballance of between the Fluids & Solids is established we find the Effects of Plethora in the Lungs where the Resistance is least hence ye Frequency of Haemorhages from them in young Men. the last Effect of the Powers of Evolution is to form ye Genital Organs wch: gives a new Ballance + 333 +

Nutrition

to the Arterious & Nervous System.
— a want of this Evolution tends to
weaken the Tone of the System.
hence an Obstruction of the Vessels
is often attended wth Atonia than
a Plethora. a Vacuum is likewise
formed when the Body arrives at
its Growth between the Arteries & Veins.
— if the Veins or Excretories received the
Arterious Blood wth too much facility
we shd see no Growth, but at y^e
same time the Resistance of the Veins is taken
off. the Density of the Arterious be=
=ing increased by the Accumulation
of the Blood, & the Plethora than

appears no longer in the Arteries but in the veins. here you see the Reason why young men are most subject to Arterious Haemorrhages and Inflamat.y Diseases & old men to all the Diseases that arise from Venous Plethora.

Qu. 4th Question occurs here how is Nutrition performed after the body arrives at its Growth?

— to this I answer that there may be Erosions & Solutions of the Calcarious Matter of the Bones wch. disposes them to be absorbed & so carried out

of the System. Attrition howeverday is constantly wearing away the solid matter of our bodies. This can be performed only in the large ves=sels, but we have no proof of its taking place. The blood is applied to polished surfaces wch are notliable to abrasion. The surface of every part of the body is provided with secre=ted juices wch prevent the immediate contact of the solids wch pass thro them. Nor can I admit Erosions or solutions taking place except in morbid Cases which bring us back

to our former Ch.r of the Causes of the Growth of the Body. The Nutritious Matter then when applied after the Body arrives at its Prime instead of giving greater ~~Dens~~ Extension gives greater Density. hence the Solids are always growing harder insomuch that in extreme old Age they are no longer pervious to the Circulating Blood. This Gentleman finishes not only Nutrition but our Physiology in General. we shall next proceed to the Pathology.

Pathology treats of the morbid state of the Animal Body. It is of two kinds 1 General & 2 Special. the first treats of Diseases Abstractly by investigating their Causes & Effects. the second is that which treats of the Causes & Effects of Diseases as they occur in particular Persons. so that the first gives the Pathology of Physiology, the second gives Pathology of the Practice of Physic.

I shall begin by giving a Definition of a Disease by which I understand that Condition of an Animal Body in which its Functions are not performed at all

a Disease what?

or very imperfectly. see §34 of Dr Gaulin's Pathology. a Disease has been considered by Physicians in two ways 1st as an apparent - manifest Interruption or Lesion of the Actions of the human Oeconomy without any Regard to the internal State of that Body. this is the view which common People have of Disease. the 2nd way (wch is peculiar to Physicians) of considering a Disease is it is that Condition of the internal parts of the Body wch unfits it to perform its Ordinary healthy Actions, wch Condition is to be found out by Reasonings. this is Dr Gaulin's Definition of a Disease.

a Question arises here & y^t is wch of these Definitions shall we admit? For a long time the 1st of them was only employed by Physicians, and indeed we arrive at our Knowledge of Diseases only by certain ~~apt~~ external Appearances. I adopt therefore the Definition I gave when I set out, that is the 1st of these Definitions viz: that it is that Condition of the Body in w^ch (& not by wch as Dr. Gaubius has it) its Actions are not at all performed or performed wth Difficulty. our chief Regard then must always be paid to the external Appearances without any attention to the internal State of the Body in forming our Judgm^t of the Presence of a Disease. But now

shall we know when the Body deviates from its healthy state? ~~since~~ every Persons Constitutions differs & wch is Health in one Man would be Disease in another. Besides I believe few Men in the World enjoy uninterrupted Health. we must then allow a "Latitudo Sanitatis" & our Judgment of Diseases must be deduced from a Medium state of the Body when supposed to be in Health wch must include the Deviations from Health wch arise from Age Sex & Temperament, as also the Imperfections in the Perceive of the Functions in particular Persons wch arise from Fatigue &c. there are

a Disease what?

never to be considered properly as Diseases since no One is exempted from them, & since Nature herself quickly removes them by the ordinary powers of the Oeconomy. I now Repeat again y: ~~ordi~~ that state of the Body only is to be considered as a Disease when y: Functions of the healthy ~~or~~ Body are so interrupted as to be performed w: the remaining ~~[illegible]~~ for a considerable time & w: are Obvious to our Senses. I must add here that our Notions of Disease must likewise include the state of the Mind. But here too we must allow a Latitudo "Lanitatis" Physic has nothing to

a Disease what?

do the w: any Diseases of the mind which do not depend immediately on the State of the Body. Folly & vice are the Objects of Philosophy & not of Physic Unless we can prove they arise from some morbid affection of the Body. —

I go on now to explain other terms in Pathology. Diseases are marked or distinguished by their Causes, for every Disease is an Effect which depends upon a Chain of Causes. this may be illustrated by supposing a Man in a sea Fight killed by a Splinter struck off from the side of the ship. the Splinter here was the Immediate or proximate Cause of

the Means Death. but a train of Causes conspired to produce this such as ye Ball y^t broke off the Splinter - the Cannon from Whence the Ball came - the powder that drove it & the Spark that set fire to it. all these are considered as remote Causes.

The immediate or proximate Cause of a Disease is that state of the Body in wch the Functions cannot be performed properly or wth Ease. thus in a Rheumatism the proximate Cause is the Over Distention of the Vessels of the part affected. but a Series of Causes conspire to produce this Case such as Obstruction - an Increased Action of the Blood Vessels - the Alternation of Cold & the Skin. all these last Causes are distinguish^d by ye name of Remote. Remote Causes are seldom

simple, but mostly act in Conjunction w:th One Another. Thus the Obstruction & the increased Action of the Blood Vessels in the Rheumatism are always combined together. Let us take another Example. The proximate Cause of an Ascites is an Accumulation of water in ye Abdomen. This Accumulation is owing to ye vessels exhaling too much Lymph. This Exhalation may be owing to a Stagnation of Blood in the Vena portarum. This Stagnation may be owing to a Suppression of some usual Evacuation such as the Hemorrhoidal flux w:th Suppression was occasioned by the Application of Cold

Cold here was the only remote Cause
— All the Other Causes are so com=
=bined that they are to be considered
as parts of the proximate. Our Indi=
=cations of Cure therefore in Diseases is always
proportional to the Nature or Number of
the proximate Causes. so that every
Change you see induced upon the
Body is to be considered as connected
w: the proximate Cause. Even the Remote
Cause is sometimes connected w: the
proximate. thus if the Splinter we
before spoke of continues in a
wounded part so as to keep up a con=
=stant Irritation it is then to be

considered as the proximate Cause of it. In a word then every Cause that gives Rise to an Indication is to be considered as part of the Proximate, & those as Remote which do not give any Foundation to Indications. Predisposing Causes (of which we shall speak hereafter) may sometimes act as proximate. thus if a Man from a plethoric State is subject to Haemorrhages, this Plethora is considered generally only as a predisposing Cause but I think it should be considered as part of the proximate Cause as it requires an Indication of Cure to remove it. proximate Causes have

sometimes have called Continent Causes as comprehending all the series or Chain of Causes wch conspire to produce the Disease. this certainly gives us the most distinct view of the nature of the proximate Cause of a Disease. See Dr Boerhaave's definition of the proximate Cause wch I think by far the most unexceptionable of any I have yet seen § 740. the Causa proxima is the only true physical Cause of a Disease see Dr Cullen's § 61. & § 74. according to his Ideas the proximate Cause of a Disease is that Cause upon wch the Actuality (as he calls it) of a Disease depends. all the

Causes of a Disease what?

Other Causes connected with the proximate he calls Principia or only possible Causes. M: Sauvage has adopted this Distinction & uses it thro' his work. Could we adopt it likewise it would overthrow all the Distinctions of proximate & remote Causes, & thus give us more simple Views of the Causes of Diseases. The word Principia includes every Cause that is not proximate. But however just this Distinction is we must not dissent so much from the common Language of the Schools as to adopt it.

One more Difficulty occurs here & yet is how shall we distinguish a Disease from its proximate Cause? See Dr Gardiner's answer to this Question § 60.

he considers Causes as acting simply as Remote but when they are combined so as to produce a Disease he calls them proximate. but this notion is peculiar to himself. Dr Boerhaave was sensible of the Difficulty of this Question see Again 2740. the Difference then between a Disease & its proximate Cause may easily be resolved by having Recourse to our Definition of a Disease viz: that it consisted in apparent & uneasy & permanent Lasions of the Functions of the Body. the proximate Cause is that which occasions these Symptoms.

Causes taken in a larger Sense are very Compound. some Causes act only on certain Bodies, & some Bodies again

Causes of Diseases what?

can only be acted upon by certain Causes. in the human Body the Body is the Patient, external Bodies are the Agents wch act on it, & these Agents will act according to the Condition of the Body. — If a Body is affected by an Agent that does not act on all human Bodies universally that Body is said to be predispos=ed to such an affection, & this Cause is called in Latin "Causa Predisponens" — these Agents wch act only in Cases of Predis=positions are called Occasional or procata=tic Causes. hence Dr Boerhaave speaking of Occasional Causes says "Solis occa=sionibus predisponitur", see also Dr Gaubius §59 on the Distinction of these two Causes.

Causes of a Disease what?

It is not sufficient therefore in enumerating the Causes of Diseases to mention the Occasional Ones Only. the Remote Causes should always be pointed out likewise as those Causes do operate alike on all Constitutions without any peculiar predisposition. thus a certain Degree of Force will produce a Fracture in every Mans Skull. here then you see a Remote Cause producing a Disease without any Predisposition. But Again a Predisposition may produce a Disease without an Occasional Cause such as a Plethora which Often induces a Hemorrhage without any Occasional Cause to excite it in those who are disposed.

(Cuer.

Symptoms of a Disease what?

This finishes our Acct of the Causes of Diseases we shall now go on to mention the Terms used to express the Effects of Diseases. a Symptom is every apparent Deviation from the usual ordinary healthy state or every Phenomenon wch does not occur in Health. It is always somewhat externally evident. a Symptom may sometimes be ye Disease itself as in the Case of the Loss of Sight — but a Case of this kind very seldom occurs, Even a Loss of Sight is always attended wth more or less of a preternatural Enlargement of the pupil or with Head-Ach. a Disease then & its Symptoms may in almost all Cases be distinguished from each Other. See Gaubius § 86.

Symptoms of a Disease what?

Symptoms have been viewed in different Lights from their Causes & have been divided into 3 kinds 1st Symptomata Morbi. 2 Symptomata Causæ & 3d the Symptomata Symptomatum. the 1st are ye Symptoms of the proximate Cause. the 2d are the Symptoms of the remote Causes. the 3d are secondary Symptoms proceeding from the two first Symptoms. as they may be illustrated by taking notice of a Pleurasy. thus pain - Fever & Cough are Symptomata Morbi or Symptoms of the proximate Cause, but if a Coryza or Anginna attends a Pleurasy it is

called Symptoma Causa remota, or Symptoms arising from the Action of Cold. the Difficult Respiration wch is the Effect of the pain & not merely of the Inflammation is a Symptoma Symptomatis. the Distinction of these three kinds of Symptoms have ~~been~~ their use in Physic. — Those Symptoms wch are Pathognomonic Signs of a Disease are properly called Symptomata Morbi. the Symptomata Causa seem rather to arise from a Conjunction of two different Diseases. thus a Hemorrhage sometimes attends Epilepsy when it arises from Plethora, but here are two Diseases for we often have Plethora & no

Epilepsy & vice versa, & we moreover find the one often continues after the other is removed. see Dr Gaubius §94. the Angina w.h attends a Miliary Fever is by no means to be considered as a Symptoma Causa, but as a superadded Disease w.h often requires a different & particular Cure.

The Symptomata Symptomatum are not necessarily present. thus a Person from being afflicted w.h a Catarrh may vomit up blood. here the Haemorrhage from y.e Lungs is a Symptoma Symptomatum arising from the Catarrh but it does not always necessarily follow a Catarrh. these Symptomata Symptum. altho' they dont necessarily occur

Wills

William Hobson

are nevertheless necessary parts in the History of every Disease as they depend on or arise from the proximate Cause. Sometimes it is difficult to distinguish whether they are Symptomata Morbi or Symptomata Symptomatum viz: show still further the necessity of enumerating them in the History of a Disease. they moreover tend to point out to us the Degree or violence of a Disease.

Dr Gardiens has introduced two other distinctions of Symptoms viz Symptomata Activa & Passiva. the 1st he supposes to be certain auxilliary Symptoms viz: owing from the efforts of Nature to cure herself when diseased. thus vomiting in Consequence of something poisonous

taken into the Stomach arises from the Efforts of Nature to remove it w: Offends her. But here the Poison acts Mechanically on the Stomach, & by its Irritation brings the Stomach into Contraction w: causes it to throw it w: lies there. in a word those who adopt the notion of Symptomatic Fevers suppose that they are all the mere Operations of the Soul itself exerted in Order to remove any thing that Offends her. I grant the animal Body has a Power to obviate the Tendency of the Causes of a Disease but we have no Reason to suppose this depends upon the Action of a rational intelligent Being, if it does act it must be Mechanically in Conjunction w: the Body

Symptoms of Disease what?

I grant likewise such Symptoms do exist as may be called Symptomata Activa or Auxillaria wch are essentially different from the Symptomata passiva. The Symptomata Activa are best distinguished in a Fever. during the cold Fitt 2/4. Symptoms are every passive but during the hot Fitt the Symptoms are Active as Nature is then making Efforts to remove the spasm wch causes the Fever. but there are certain Symptoms wch we cannot tell to wch of these Classes to refer them, such as Remors &c there are likewise many Other Symptoms in all Diseases wch we cannot tell wch they are, whether they are Active

or positive. But there are other Symptoms to be taken notice of besides these. A man who is already afflicted with a Disease is liable to be afflicted with any other accidental Cause which may cause a new Disease. Thus a Man in a Fever may receive a Blow in his Head which may bring on a Train of Accidental Symptoms. Now these Symptoms are called "Symptomata Fortuita", & should be closely attended to, as they are either Mocentia or Ladentia. Upon this Acc: Symptoms are distinguished into Essential and Accidental or according to Dr: Gaubius into "Necessaria" & Non-Necessaria".

A

Symptoms of Disease, what?

But Further a Disease we said consisted in a Concurrence of Symptoms. — but these Symptoms vary exceedingly during the Course of a Disease, hence they ~~they~~ have been again divided into "simultanea and perpetua" the first occurs mostly in the Beginning of a Disease. the last more probably characterise a Disease.

This finishes our Explanation of the Terms of Pathology. we shall now proceed to the Division of the Institutions of Pathology. we shall therefore in our present Lectures begin

1. By considering the proximate

Plan of Pathology.

Cause of Diseases.

2nd: we shall treat of the Symptoms of the proximate Causes &,

3rd: we shall consider the Remote Causes or the potestates hominum as well as those which are occasional and act only in Cases of Predispositions.

I. The proximate Causes of Diseases are seldom simple. they often consist of a Complication of Causes wch: affect and operate on different parts of the body — But we shall notwithstanding endeavour to consider them in as simple a Manner as possible as affecting either

the Solids or Fluids. we shall begin by pointing out the proximate causes of Diseases in the Solids. these are to be considered as simple, or as Solida viva. the Pa==thology of the simple Solids I delivered pretty fully when treating of the Physiology of them. I shall therefore proceed to speak of the Diseases of the Solida viva or of the moving Fibres. By the Solida viva I mean all the Organs of Sense as well as Motion, as these are the two principal functions of the Nervous System. I shall begin by considering the Morbid States of Sensibility.

I Sensibility is always relative

to Age, Sex, Temperament or Idiosyn=
=crasy: we cannot pretend to establish
a standard of it: we can only point
out w^h Increase or Diminutions of it are
morbid. we shall therefore consider the
different Circumstances which influence the
Sensibility of our Nervous Fibres in general,
but more especially those of the dentient
Extremities. Sensibility we know depe=
=nds upon a certain Condition of y^e nervous
Fibres wch we before presumed was owing
to a subtile Elastic Fluid always adhering
to the nervous Fibres. Sensibility will then
depend i^n upon the Mobility of this
Fluid. the more rare & Elastic the more
moveable it becomes. the Fluid will

likewise depend upon the nature or aggre=
=gation of the solid substance of the nerves,
which we know are widely different according
to the nature of the original stamina.
we presume then that sensibility will
be considerably influenced by the state
of the original stamina. hence we
find a peculiar kind of sensibility
often ruins this Life in certain Con=
=stitutions. this appears more probable when
we recur to what we before said of the nerves
being the organs of sensation. we presume
still further that sensibility is influenced
by the original stamina from the changes
which sensibility undergoes in different

States of Life. Infants we see have less Sensibility than Children further advanced in Life. we find indeed that Sensibility is encreased till the Body arrives at its Prime, from wh: it appears that the nervous substance as well as the simple solids are acquiring a more firm Texture thro' time. the Brain is always heavier in proportion to the progress of Life, from wh: we infer that the nervous Fibres are likewise acquiring Density as well as the Brain.

2nd External Bodies influence the State of Sensibility such as Heat & Cold.

a. Heat first excites the Mobility of the nervous Fluid & very considerably inflames

(2) "The Ignorance of the Africans & other nations who live under the Line may be attributed to other accidental Causes rather than to the Heat of their Climates affecting the Vigour of their Faculties."

$\frac{e}{y}$ different states of Sensibility in $\frac{y}{e}$ heroes. – in general we find it encreased by Heat: hence Constitutions are most sensible in warm Climates, & ~~wood~~ th. People in hot Countries are always endowed w th more exquisite Sensibility w th Regard to every thing that those who live in cold Climates. But Again all Constitutions in every Climate are more sensible in summer than winter. There is a certain Degree of Heat w ch is most favorable to Sensibility insomuch that every Degree of Heat which goes beyond it rather diminishes Sensibility & it is equally unfavorable to our Functions with Cold. It moreover takes off from the

generating power of Heat which we shall show hereafter is much connected with the Nerves. B, do Stimulants give more Elasticity or Mobility to the nervous Fluid? our Materia Medica Writers wi: foign persuade us that they do from their notions of Cephalics &c. for my part I know of no Stimulants that do excite the nervous Fluid so as to increase Sensi=bility. But we know another Kind of Medicines called Sedatives that do influence Sensibility very considerably. These Sedative Medicines are either Chemical or Mechanical of wh: more hereafter. C, Sensibility will be considerably

influenced by the state of Tension in the patient extremities. Nature has taken great pains to promote & keep up this Tension in the extremities of the nerves by the uniform manner in wch she has distributed the Blood vessels along wth the nerves. even in the Retina itself a layer of Blood vessels has been discovered. – they are likewise to be demonstrated very plentifully ~~in the~~ accompanying the minute papillæ of the Tongue. – we may presume from this that all the nerves in like manner are equally accompanied wth Blood vessels. Sensibility will therefore depend upon the Tension of these Blood vessels hence another reason

(a) "I believe even Palsies may arise from a Compression of an Artery as well as a Nerve so much does the Arterial Blood influence Tension & Sensibility."

offers itself why Sensibility increasing till the body arrives at its acme upon the account of the Disposition to Plethora or to the impetus of the blood in the Arteries during Growth. But we have a still more convincing proof of Sension influencing Sensibility from the extreme sensibility which different parts of the body acquire when inflamed wch: is solely owing to an Increased Influx & Impetus of the blood into the blood-vessels. even those parts wch: have lost their Sensibility by an Excretion of cellular substance or from morbid Causes have it again renewed by Inflammation. Dr Haller has given us many Examples of this.

d, sensibility of the nervous extremities will depend upon the state of the Origin of the nerves. a certain Freedom of pensorium is Absolutely necessary to sensibility. a Degree of compression immediately takes off sensibility. this is evident and obvious to every Body. But further sensibility may depend upon the different states of excitement in the sensorium, which greatly affects the extremities of the nerves. this excitement may arise from a proper Degree of Tension in Consequence of the influx of blood there. an increased impetus of the blood are at then give an additional excitement to the sensorium, & thus encreases

sensibility. the great sensibility we observe in persons afflicted wth fevers seems to arise from the excitement of ye sensorium being communicated to every part of the body. We often observe patients in phrensies & mania that they have a greater sensibility in some parts than in others to peculiar impressions this seems to arise from one part of the brain being in a more excited state than the other. in these cases it is difficult to say whether the increased sensibility depends on an affection of the organ on wch the impressions are made, or upon an

affection of the Sensorium itself. I can here adduce a curious fact which seems to show that it depends on a morbid affection of the Organ itself. I once knew a Lady who laboured under a false Imagination & fancied she was perpetually surrounded wth Hobgobblins & Devils insomuch that she cried out often in the utmost agony. many Attempts were in vain made to cure her, till at last the Physician who attended her removed it entirely by blind-folding one of her Eyes. 2nd As an excess of sensibility depends on a too great Tension of the Brain so a want of Tension in the Brain may bring on a want of Sensibility

to external Impressions. this appears to be the Case in Idiots, altho I cannot say we have any proofs from Dissection of their Brains being in a collapsed flabbid State.
.b. Sensibility is deminished by Compression more especially in the Sensorium itself.
.c. Attention very considerably influences Sensibility. the Mind can be employed upon but one Object at one & when this is the Case it is insensible to all Other Impressions unless they are much stronger than the One he is occupied with. thinking long on one Subject wearies the Mind, hence there is a Remission in our Attention from particular Objects.
- the Attention of the Mind will be greatly influenced by the novelty of the

Object by its being attended wth more or less volition or of interesting Relation. From this you see there may be different Degrees of Attention. When it is in a very high Degree it induces a Rigidity in the Brain insomuch that the Attention continues even after the Object is removed wch excited the Original Impression. This appears to be the Case in Catalepsy in wch the Patient continues in the same rigid Posture for a considerable time in which the Disease first seized him. These Catalepsies are generally bro't on by very fixt attention. Fulpius gives us a remarkable Case of a Man

who upon meeting w.th a Repulse from his Mistress remained in a fixt Cataleptic state for many days, & was cured by being told that his Mistress w.d be favourable after every thing else was in vain attempted to rouse him.

d. Sensibility may depend upon the different Degrees of Excitement of the Other of our ~~Senses~~ Brain. we all know that there is an intermediate state of Sensorium between Sleeping & waking. hence we call a Man of great vivacity "bien Eveillé" & a very stupid Fellow a Creature half a Sleep. if these Degrees of Sensibility then are so obvious we may readily presume that an additional Excitement in the Brain may greatly influence the Sensibility as

well as the Contractility of the whole System. But here a difficult Question occurs. we have Instances of the Brain's being in a healthy excited state, & the whole System in a morbid state of Tension in Maniacal Persons & yet what is very surprizing they are possessed of a high Degree of Insensibility to all external Impressions especially to Cold - Opiates - & Medicines of all kind. here is Insensibility connected with the highest state of Excitement in ye Sensorium. this seems to overthrow what we have before advanced, but I think it may be reconciled with it. this state of the Sensorium may then depend upon

upon the Density of the Other being
encreased th: w: Regard to its Elasticity. for
the healthy Degree of Sensibility
depends upon a certain proportion be=
=tween the Elasticity & Density of the Other
of our Nerves. But another Solution
may be given to this difficult Problem
— we Observe the Insensibility of Maniacs
to be chiefly th: Regard to Sedative Impres=
=sions. But are Mettlicks & Nurcotics
sedative? Some have supposed they
are, but I cannot say positively that they are.
One more Solution may be offered — a
Maniac may be considered in a State
of Excitement or in that State of Rigidity we
before spoke of in the Catalepsies. This

is evidently the Case in Melancholic Persons. & hence their ~~Atten~~ Insensibility to Cold & Other Impressions may arise from their Attention being previously too long fixed to One Object. in the Maniacs the Case is indeed different for their Attention is perpetually running from Object to Object yet indeed in them the Excitement of their Nerves may be in the rigid State of Catalepsy the Patients, Altho' their Sensorium is not in that State

e, Sensibility is greatly influenced by Habit. - it is then always relative & never can depend upon the Absolute Force of Impressions.

So lastly Sensibility depends upon the State of the Nerves or Organs of Sense themselves. thus the Crystalline Lens when more or less opake greatly influences vision. the greater or lesser Thickness of the Cuticle will influence Sensibility in particular Persons & should always be attended to in enquiring into the different States of Sensibility in different Persons.

II Irritability. This is the most important & for the same Reason the most difficult part of Pathology. as being Deeply involved in the Mystery of the Nervous System. I shall however

attempt to say something upon it & endeavour to make it as clear as possible.

The word Irritability has been taken in different senses. The Physiologists understand by it the Contractility of Muscular Fibres. Dr. Gaubius calls it the vis vitalis. He understands by Irritability the morbid Excess of the vis vitalis. Is an Excess of Strength of Contractility in Muscles to be called a Disease? Dr. Whyt imagines not. See "Nervous Diseases" p. 91. & therefore attributes all Excess of Irritability to too great Pensibility or to a weakness of the moving Fibres. I grant when the Excess

of strength in the Force of Contractility ~~which~~ is diffused all over ye Body it is not to be called a Disease, but when it is in particular parts only or when greater in one part of ye Body than the Other then it may be said to be a morbid Case of Irritability.

I find it difficult to say in w^h Cases such a morbid affection occurs. the Inflamatory Diathesis of the body perhaps may be considered as a Disease of this Nature.

an Inflamatory Diathesis consists in an increased Impetus of the blood w^h depends on an increased Action of the heart & this is always proportioned to the

stimulus applied to them, or to the distending power of the blood. here there is an excess of the Force of Contractility. hence we often find Instances of topical Fever or an encreased Impetus of the blood in particular parts without an encreased action of the heart & Arteries. this then being owing to nothing else but an encreased Contractility or Irritability in that sense in which Physiologists use the word. Other Cases of particular Irritability might perhaps be pointed out as depending on an excess of Tension in particular parts. there a-

young widow who has long been used to ven: enjoyments when first she is deprived of them, from a tension brot on in the ven: Organs & Alimentary Canal to so high a Degree becomes subject to a train of Hysteric Discorge.

But this kind of irritability does not depend upon encreased Sensibility as Dr. Gaubius supposes, nor is it that kind of Irritability wh: is excited by gentle Stimuli, or gives Rise to what he calls the "Motus enormis" I must here observe that the word Sensibility has been used in a too vague Sense. most of People understand by it a power of the Body to be acted on

by external Agents. but I would confine its meaning to Impressions made on the Nervous System only or to an Impression on one Nerve which excites Contractions on other parts without the Intervention of Sensation. I would likewise restrict the word Irritability entirely to Muscular Fibres or a Disposition to contract in Consequence of certain Impressions. Irritability is only to be considered as morbid, when it induces irregular Contractions. a rapidity of Contractility is by no means to be considered as a morbid Irritability.

Lu this more fully illustrated by Dr. Cullen's § 743. For ~~was~~ however much Authors may disagree in their Terms, they all agree in referring the Morbid Cases of Irritability to <u>Irregular Contractions</u> of Muscular Fibres whether convulsive or Spasmodic. Let us now enquire into the Cause of these Irregular Contractions.

1st. They may depend upon a Morbid Affection of Irritability in y moving Fibres even while the State of y moving Fibres remain y same.

2nd. They may depend upon Sensibility & Irritability being in an Excess or upon too great Mobility of the Nervous Fluid, or in Other words upon the Proportion

Diseases of the solida viva.

between Irritability & Sensibility being destroyed. in this Case a weakness generally attends the Contractions. hence they are peculiar to weak Habits - Young Persons & Hysteric Women.

3: They may depend upon the State of the moving Fibres themselves, without any Connection wth Sensibility. They depend upon a want of Tension, or upon too moveable Tension. Most of the irregular Motions we perceive in the System arise from these Causes. let us i^t enquire into the Diseases arising from a want of Tension. the most simple Affection depending on this Cause is 1: Tremor. Tension

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often depends on a weight apprehended. now if this is removed a Tremor naturally ensues. it would be easy to mention a hundred Examples of Tremors arising from this Cause. Tension likewise depends on a Fulness of the Blood-vessels in particular Limbs. hence a tremor of the Hand often follows Dissection. Universal Tremors also are often the Consequence of general Hemorrhages. Depletion may act too by taking off Tension from the Brain & thus diminishing the tonic power. the Passion of Fear acts in a Same

way. in a word Tremor almost al-
ways follows a want of Tension. it is
more Abundantly confirmed by our
being capable of removing these
Tremors either by weights appen-
ded or by internal stimuli. hence your
Dram Drinkers who are so subject to
Tremors can cure them-selves at Once by taking
a Dram w: acts by promoting Tension in ye System.
. On what do these Tremors depend?
— I shall just offer a Conjecture.
perhaps on a want of ~~tension~~ Density in y^e
Other of our Nerves w: gives it a
greater Disposition to Oscillations. this
is confirmed by ye Analogy of Air & Other
Fluids w: are always most mobile when most
rare.

Diseases of the Solida viva.

2nd Convulsions wch are an Alternate Relaxation & Contraction of Muscles likewise depend on a want of Tension. these are then nothing but Tremors in a higher Degree. great Hemorrhages wch induce a general want of Tension often bring on Convulsions. perhaps their Operation may be confined chiefly to their taking off the Tension & Excitement of ye Brain. this seems still more probable when we consider that the same Causes wch induce Syncope likewise bring on Epilepsy or general Convulsions. — thus Blood-letting wch brings on Fainting

in One Persone will bring on Epilepsy in Another. I consider then the sudenly taking off Tension or Excitement from the Brain to be the chief ~~to bow~~ Cause of Convulsions. perhaps some Other Causes may likewise contribute to bring on Convulsions, but all those are such as Operate on the Brain such as exquisite Pleasure or pain. how they Operate is difficult to say. It is enough for me that I have established the general Proposition. I shall Only Observe further that all the causes which produce Epilepsy first produce

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a Deliquium Animi wch is an additional proof of all Convulsions depending on a want of Tension in the Brain. On w^t does 3rd Spasm depend? it is nothing but a higher Degree of Convulsions. or Convulsions wch do not readily admit of Alternation. it is generally more or lesser mixed wth Convulsions & almost always terminates them. Spasm likewise depends on a want of Tension as well as Convulsions. thus we often see a Muscle fall into a Spasm when the Antagonist Muscle is not in Action. hence we find the Cramp is removed by pressing the Foot

against a board placed at the bottom of a bed, or otherwisely suddenly jumping out of bed, so as to restore a due Tension to the Muscles of the Leg. Other Causes may bring on spasm as well as want of Tension of ex we shall speak hereafter. To illustrate what has been said, I shall add that every Irregular motion must encrease itself & produce higher degrees of Convulsions: By Habit all our Actions are fixed to a precise Manner of Performance — to a certain velocity & a regular succession in Order. Thus every Man has his

manner of speaking, but if any thing interupts this manner, how easily is he thrown into Confusion by the Ballance of the System being destroyed! this will teach us how Stimuli produce Convulsions.

They act by bringing on an encreased influx of the nervous Fluid & thus increase irregular motions which by time and Habit become natural to the System.

Stimuli then act by hurrying the nervous power & thus bring on irregular motions which in all weak Habits must necessarily encrease themselves. What has been said applies to all Cases of Convulsions depending on Inanition

& not Repletion. the first we have already considered. We shall now consider the Second. which we said formerly ~~acts~~ acted by inducing too moovable & exquisite a Tension in the System. as Depletion from Hamorrhages induces an Atonia so Repletion or a Plethoric State of the Blood Vessels gives a Moveable Tension which lays a Foundation for a Morbid Irritability.

1st This Exquisite Tension may depend on the Mobility of the Nervous System itself

But 2nd It will depend on a too great fulness of the Blood Vessels arising

from a morbid laxity in the solids. — hence they easily yeild to ye Quantity & Impetus of the blood. this Laxness then gives a very variable & movable Tension. — this Laxity not only gives occasion to exquisite Tension in ye whole System. But any thing that gives a laxity to a particular part & encreases the Impetus of the blood in it at ye same time will induce a Tension in a particular part of the Body. hence we find after the Paracentesis a Deliquium Animi ensues merely from the Tension being encreased in one part & Destroyed

in Another. Small Alterations in the Ballance of the System will always affect the Body in proportion to its Mobility. — In what Constitutions does such an exquisite Tension occur? In all Persons who have lax Solids especially in young People in whom the Impetus of the Fluids is greater than in Old People. Infants who have the most exquisite Tension of System are upon this Account most subject to Convulsions. This Predisposition to Convulsions is always encreased in Cases of very sudden Growth when the Solids are suddenly stretched; or where the Impetus of

* these

Diseases of the Solida viva.

the Blood is such that the Solids do not yield to them.

hence the great Frequency of irregular Motions such as Chorea Sanctiviti &c in Young People about the Age of Puberty. the Epilepsy in Men &c: Hysteria in Women may be deduced entirely from [redacted] Causes. in Women more especially there is a new Source of Vessels opened wch gives Rise to a most exquisite & Moveable Tension in one part wch greatly influences the whole System especially the Alimentary Canal wch is ye Seat of the Hysteria & wch receives its Blood Vessels from the same great Branch as the

Diseases of the Solida viva

Uterus. Why do Hysteric Motions happen in some Females & Epilepsy in Others. the Diseases both occur in the same Systems & depend on ye same Causes. they likewise depend on the same predisposing & Occasional Causes such as Plethora & the various Passions of ye Mind. even in their Symptoms they are similar both occupying the same Functions. nay they often unite in ye same Persons & at ye same time. What Circumstances determine the One to affect the Alimentary Canal &

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the Other the vital & involuntary motions? — the Answer to this I have hinted at. It seems in the Hysteria to depend upon the Communication between the Blood-vessels of the Uterus & Alimentary Canal. The Hysteria is attended w:th Spasms gradually rising upwards in the same manner as the Epilepsy. But the Epilepsy always rises higher & produces its irregular motions only by reaching the Sensorium.

— By what Circumstances are these irregular Motions bro't on? — Many Causes w:ch induce them act by taking

of the Excitement of the Sensorium.
Fear is the most common Occasional Cause of them & this we are sure acts in this way. But the Repetition of these Convulsive Motions cannot depend upon the Loss of Excitement in the Sensorium. we might indeed here call in the Effects of Habit to account for the Frequency of their Repetition. for we often find these Convulsive Motions occasioned merely by Plethora itself without calling in any external Occasional Cause especially when this Plethora is determined to the Head. hence I have often seen

able to foretel an Hysteric Paroxism merely from the Turgescence of ye Vessels of the Head. It is of great Importance in the Practise of Physic to attend to this Observation. The Plethora seems to act by inducing a too exquisite Tension of the System wch: disposes it to be affected by the slightest occasional Causes. the Blood is often determined most to one part of the Brain. This produces an Inequality of Distribution in the Blood's Course wch: may act as a Stimulus & thus bring on Epilepsy &

& Hysteria. we may from ye same Reasons account for the Convulsions wch sometimes attend a partial Phrensy. — But further in many dissections of Epileptic Patients we find Schirri & Ossifications in the Brain. these may act as stimuli & thus joined wth Plethora prove an occasional Cause of Epilepsy by inducing an Inequality of Tension in the different parts of the Cerebrum. this finishes our Ac: of the morbid Causes of Irritability. I shall only here repeat the Causes wch bring on irregular motions. they are 1. Stimuli wch act without any ~~Concurrent~~ Predisposing

Cause ~~that~~ merely by producing hurried motions, wch destroys the Order & velocity of our Actions. But they may depend 2nd On very great Sensibility wch acts in the same manner as the stimuli we spoke off, It is not unmitigated wch increased Irritability.

3rd Upon the Mobility of the nervous System itself depending upon the nervous Ether or the Nerves themselves

4 - Upon a want of Tension in the System

5th Upon too exquisite Tension. This is the most frequent Cause, as it exposes the System to be affected by a thousand occasional Causes of irregular Motions.

Diseases of the Fluids.

Having now treated of the Diseases of the Solids, both simple & nervous, we shall go on to consider the proximate Causes of the Diseases of the Fluids.

These ~~are~~ ~~cause~~ at first sight appear more simple & easier understood than the Diseases ~~of the Dis~~ ~~eases~~ of the Solids, but notwithstanding they have been the subjects of the Inquiry of Pathologists for 2,000 years I must say we know but very little about them. All I shall aim at is pointing out the Errors that Authors have introduced here, thus will the way be clearer for further Discoveries.

Diseases of the Blood

I shall first consider the Diseases of the common Mass of Blood. these either respect the whole Heterogeneous parts of the Blood or the several parts of wch it is composed. we shall begin wth the first. the Blood we know is of a middle Degree of Fluidity not so fluid as water, nor so viscid as many Liquors. we shall begin with considering the Excess in viscidity or Lentor of the Blood. the Consistence of the Blood may depend 1st on the different proportions of its constituent parts, & 2nd upon the Quality

of these parts. Its Diseases will depend upon an overproportion or bad Quality of either the Red Globules or Coagulable Lymph. It is hard to ascertain the exact proportion of the Red Globules as we never can get them entirely separate from the Coagulable Lymph. even the Coagulable Lymph too always carries with it a considerable Quantity of Serum. Some have supposed that an Excess of the Quantity of the Red Globules might be determined by their Specific Gravity as they alone are heavier than water. But this cannot be done

as we cannot obtain them in a pure
vio state, nor can we measure them
by their Bulk as we never can tell
how much Halitus escapes from them.
- Nor can we form any Judgement of
their Quantity from their Causes. we
are ignorant in w: manner they are
formed, or w: Aliment yields them most.
- In general they abound most in those
who are most healthy & vigorous so that
their Quantity may in some measure
depend upon the powers of Assimilation.
But
- even this is liable to fallacy as we
find them in the Chick in Ovo where
no strong Assimilating powers are observed.

I have here formed a Conjecture. all the Fluids of our Body would escape from the Blood-vessels, however small we may consider them, was it not for the Red Globules which confine the other Parts of the Blood as being too large to pass thro' the Blood-vessels. — the Fulness — tension & Growth of ye Body then may depend upon the presence of Red Globules in the Blood. hence the Plethoric State may be considered as ye Cause of an Excess in the Quantity of Red Globules. see Dr Gaubius §356. I do not imagine this Quantity of Red globules can dispose to Inflam^n

Diseases. these depend entirely upon the Plethoric state indeed, & have no Connection wth state of the Fluids.

2nd we come now to speak of the Quantity or Repletion of the Coagulable Lymph. - how shall we judge of this? here new Difficulties occur. Bleeding Letting gives us no Light in this Question. we are ignorant of the proportion of it wch is natural to the Body. no One that I know of has yet attempted it. we can form no Judgement from its Density as we never can tell to w^t a Degree the Spontaneous Separation has taken place.

— The Appearance of w^h is called Inflammatory Crust is no less fallacious however much Physicians may infer from it. even Dr Gaubius himself in §367 has fallen into this Error. this Inflamatory Crust & tho' you formerly depend entirely upon the Circumstances of the Blood's Separation. Could we measure the Temperature of the Air — the velocity w^h wch the Blood flows from a vein & the given time in wch Blood always coagulates, then we might form some judgement of the over proportion of the Coagulable Lymph, but this Experiment has not, nor indeed can be tried wth any decisive Accuracy. We

have many Cases of very sudden Condensations of the Blood. One in particular related by Gerac who tells us that he saw Blood coagulate in a stream while it was flowing from the Arm of a Man. But for my part I cannot admit these Facts. If any thing will determine its Quantity or Spissitude it must be q.e Causes which induce them. Dr Gaubius mentions several Causes w.ch increase it such as Inflam.n, Fever, but these Causes operate only by altering the Mass of the Blood & never produce any Change upon its Quality. I have seen an Epileptic Patient bled one day & found his Blood

entirely dissolved, & yet the Day after it had the Appearance of natural Blood w: a considerable Buffy Coat. I think then we must always refer the Phenomena of the Blood to the Circumstances of the Circulation rather than to any Changes in the Nature of the Blood.

— But Other Causes do influence the Quantity of Coagulable Lymph particularly Element especially when we add to these a due Degree of Vigour in the Assimilating power. for vigorous Assimilating powers always give the densest Fluids & vice versa. the production of Coagulable

Lymph is encreased in Life. we cannot establish the Presence of Diseases from its Quantity or Quality, as different Men require different proportions of it according to their Manners of Life. When it is excessive in Quantity the Solids become proportionally rigid & thus resist any Diseases that might arise from it, & viceversa by which means the Solids & Fluids are always kept nearly in a Balance to each other. But further another Cause appears to encrease the Coagulable Lymph & disposes it to be more quickly dissolved in the Serum, so that an Error in the

(a) By this Means those morbid Affections w: might arise from an increased Quantity of Lymph in Consequence of Animal Food are constantly Obviated by the quick Solution of the Lymph in the Serum.

Quality of the Coagulable Lymph may be derived from the excessive use of Animal Food - hence we find those who live most on Animal Food are most disposed to putrid Fevers. (a)

But even supposing the Coagulable Lymph was excessive, yet such is its power of entangling Water than it would be receive a sufficient Quantity of it to restore the proportion it ought to bear to Serum, or the watery parts of the Blood. (a)

Plethora then can only be induced by such an Affection of the Lymph & not a preternatural Spissitude.

Some have supposed that certain ~~Aliments~~ Substances of a bifid Nature give an

increased quantity & Density of the coagulable Lymph. See Dr Gaubius § 367. upon this subject, where he attributes an increased Density of the Blood to certain astringents & spirituous substances. These substances have ~~been~~ such Effects when directly injected into the Blood, but I deny their being able to produce any such Effects when taken in, in ye Ordinary way mixed w: the common Diet. Even Acids & Alkohol are capable of coagulating our Fluids only in a very concentrated state; now we are sure they never can reach the Blood in any other way, but in the most diluted state. the

Diseases of the Blood

further they go in the primæ viæ, & the more they become diffused, & thus their coagulable qualities are entirely obviated long before they arrive at the blood. Febrile have been attributed to the use of Spirits in some of the viscera. but these Febrile depend rather upon the narcotic power of the Spirits than upon their coagulating the Fluids. Opium has long been supposed to operate on the Fluids but by long Habit it produces effects exactly analagous to Spirits. its operation then as well as that of Spirits is confined only to the nervous System.

Even Acids when combined with Fluids as in Corrosive Sublimate, in which they

are most concentrated excite no other action but that of stimulating, & instead of coagula: as some suppose, they rather dissolve the fluids.

Lactic cannot enter into our Blood except when dissolved, & they can only be dissolved into a saline form in which state they rather thin than ~~dissolve~~ coagulate the Blood.

Vegitables cannot coagulate the Blood except by absorbing the watery parts from it, this they cannot do as they are dissolved & their nature changed before they arrive at the Blood.

But w: shall we say to vised

glutinous aliments? Could these enter into the blood unchanged, they might produce a Lentor there, but we before proved that all Aliment undergoes a Fermentation in the Stomach w: loosens & destroys their Texture in such a Manner as entirely to prevent any morbid Effects from them. After their undergoing this Fermentation they are again diffused in such a Manner as to have their bifidity destroyed if any should remain after the Fermentation is over. But further, we find many Examples as among our Peasants who live on unfermented

Eat Meal, & yet these Men's Blood; never discover any Marks of Viscidity — the Farinacea make the greatest part of the Diet of Mankind. now if viscid Humors were the Consequence of them, we should have them more frequent & universal than even those Physicians who maintain their Presence have affirmed.

I conclude then that the Existence of a Lentor, or Preternatural Spissitude may be a possible Case, but we never can infer it from its Causes or Effects, nor do I know any Symptoms that will ever indicate its Presence.

Diseases of the Blood

If it can does take place it ought to produce more dreadful Effects than are commonly attributed to it. I would therefore advise you to be very cautious in admitting this Doctrine for you will often meet w: the it in Books.

3: a Lentor of the Blood has been attributed to the Abstraction of the watery parts of the Blood. But When does this take place? Nature has wisely taken Care to keep the System in a proper Ballance. if the Quantity of Serum is diminished all the serous Secretions likewise are diminished, hence an Accumula-

tion of it in the Body. Dr. Boerhaave tells us that Sudorifics & febrile Disorders dissipate the watery parts of our Blood. But we have no proofs of this. Some other functions must be stopped to compensate for the Loss of watery sweat. — the Heat of the Fluids too encreases the solubility of the Coagulable Lymph & thus the serous parts of the Blood are regenerated in proportion as they are dissipated. From all this Jas. infer that the Fluids are seldom or never discard by having their density encreased. It is a possible case only. For my part I never saw it, nor do I know any proofs of it. —

Let us now consider the opposite qualities of our fluids viz their density. this may depend upon an increased quantity of water thrown in, or upon a want of proper consistence in them.

- It is very hard to tell when ye first takes place. Nature wisely prevents it. if the quantity of water is encreased we find the secretions proportionally encreased, viz: if perspiration is obstructed the secretion by urine is always encreased.

- if a morbid density of our fluids ever does occur, it must depend on the watery secretions being obstructed, but

When this happens the quantity of water is still not increased in our Blood. The obstructed water always runs into some Cavity & thus produces the different species of Dropsies. The Blood of Dropsical Patients never shows a greater proportion of watery Matter than is natural to it. The "Tenuitas Aquosa" may take place for a few minutes as in the Ischuria Renalis when a greater Quantity of water is thrown into the Blood than is natural to it, but this is obviated by an increased Perspiration. Conclude then that a morbid Tenuitas never

occur in the Blood from an Excess of water in it.

But do not the ordinarily thick parts of the Blood lose their natural Consistence & acquire the "Tenuitas Aquosa"? no - when they become preternaturally thin, their Qualities are altered, as in Scorbutic Patients, and they thus lose their properties wch constitute them Animal Fluids. in those Cases the Coagulable Lymph alone is altered in such a manner as to unite more readily wth water. in this way only the Blood becomes preternaturally thin, as this Union wth water or Serum is always the natural Tendency of the Coagulable Lymph. the Blood in

these Cases viz: in Scorbutic Patients is broke down. this we prove from its Ceremony & from its escaping thro' parts of the body w: refuse its passage in a healthy state.

I conclude then that a Morbid Tenacity of the Blood may occur in some Cases from the Causes we ~~have~~ have mentioned. the final Cause of it may be because y: kind of Tenacity is less dangerous to the system than a Morbid Spissitude or Lentor of the Blood.

Let us now enquire into the Changes w: y: Blood undergoes in its Qualities. If ~~we~~ were to be wished here we could

condescend upon the Changes of each of the Component parts of the Blood, but this would be a difficult Inquiry, as we are entirely ignorant of the true Nature of the Mixture of the Several parts of the Blood. — the Coagulable Lymph has been accused most of deviating from its Ordinary bland insipid State. the Sapid or saline State of our Fluids has always been considered as the Only Morbid Cause of them, & hence the Foundation of the Much talked of Acrimony of the Blood. As this is a Question of Importance we shall spend some time in enquiring into it. —

i — we shall Observe the Care Nature has taken to Obviate Acrimony in our Fluids.

Our Aliment we find consists of the most bland insipid substances for the most part. Some things I grant that we take, are acrid as the Salts - the Condiments & some other things wch are of the Appointment of Nature herself, & were designed originally for our nourishment. The Proposition then concerning the bland Nature of our Aliment is by far too universal.

2nd Acrimony often attempts to enter the humors tho' not always in the way of Aliment. Nature indeed has taken great pains to guard agst it in the extreme Sensibility of the Tongue - Fauces & Stomach wch are generally excited to expel or avoid the noxious Matter wch enter into them.

Should they escape the Stomach they stimulate the Guts in such a Manner as y^t they are soon discharged by a Purging. - I somewhat doubt whether the Lacteals are possessed of such a Degree of Sensibility as some have supposed; I believe many things enter into them; wch Physiologists are not willing to admit. upon ye whole then notwithstanding the Precautions of Nature I imagine Acrimony sometimes escapes the Tongue Fauces & Stomach & enters into the Blood thro ye Lacteals. - But Nature uses another power to avoid Acrimony entering the Blood viz: the Fermentation & Other Changes

they undergo in the Primatia, even Diffusion itself is capable of abating the Acrimony of most of Substances, especially when we add to this the several Matters that must mix w:th the acrid Substances w:ch serve to diminish & destroy their Acrimony. But supposing Acrimony has entered into the Blood, I believe there are powers in the System w:ch tend to destroy it viz: the Oil in the Cellular Membrane w:ch is poured out so plentifully from the Blood. hence we find frequent Instances of its being very suddenly absorbed as it were on purpose to cover Acrimony received in the Blood.

3:d But supposing Acrimony has entered the

the Blood, & is not attended by the Oil, still I affirm it is often innocent. the Serum of our Blood acts as a Solvent to all acid Matters, & thus prevents their mixing with the other parts of ye Blood — as soon as they mix wth the Serum they are immediately discharged by some of the Emunctories. all the Actions they do create are of such a nature as to excite an Excretion of them from ye Body. — I do not suppose they act by exciting the Action of the Heart & Arteries. on the contrary I imagin they act only on the excretory vessels themselves when they are discharged. From all this you see how much pains Nature

has taken to avoid Acrimony in the Blood.
But further granting its Presence
oftner than is just, it seldom acts
upon the more delicate parts of the Body.
I believe the Arterial System has no
sensibility to its Stimulus. even those
parts wch are sensible to its Stimulus are
provided by Nature wth a Mucous wch
guards them agst it. perhaps the Blood
vessels may be defended likewise from the
Stimulus of Acrimony by the Oil wch exsudes
from them as well as by their Insensibi-
lity to Acrimony. the Secretories of several
Glands are provided wth a Sensibility to Acri-
mony & happily for the System that it
is so. for by this Means it is discharged.

But allowing Acrimony to subsist in the System, Pathologists have reasoned wrongly in inferring Diseases either from its Causes or Effects. Dr. Gaubius deduced Spasms & Convulsions from it, but in 500 Cases I am sure they depend upon very different Causes. even the Operation of our own Will is sufficient to bring on Convulsions without calling in Acrimony to account for them. Acrimony I own does take place notwithstanding the Precautions Nature has taken to obviate it, & to such a Degree as sometimes to induce Diseases, but these are much fewer than has been supposed. They are moreover of a very subtile Nature which act as Ferments upon the Blood.

I mean Contagious.

We shall then consider Acrimony as introduced from without & as generating in the Body itself.

Acrimony thus may be derived ~~from~~.

1st From the Aliment not directly acrid but becoming so by the powers of the Body.

2nd From a want of Aliment wch: Abrogates Acrimony in our System

3rd From those powers wch: give a Tendency to Acrimony being encreased such as an Excess of Heat, or Circulation of the Blood.

4th From Changes induced in the Fluids by Errors in Secretion. of this we can say but little.

5th From the Changes wch: our Fluids undergo from the Circumstances of their Stagnation. this is perhaps the most fruitful Source of Acrimony in our System — we know of no Fluids in the Body

which stagnate in a healthy state. even the Fatt itself is absorbed & poured out again constantly. all Fluids then previously effused have a Tendency to bring on Acrimony. - every portion of our Fluids are of a fermentative nature provided they enjoy Heat & Air. Now all Fluids effused in our Body have more or less of these, & therefore tend to those Changes which Fermentation naturally induces.

we have no Doubt but which Acrimony may be introduced into the System from all these Causes. but I repeat it again it has often been accused unjustly from its Causes & Effects.

But which kind of Acrimonies are they

which prevail in the Blood? Here again we meet w.th great Difficulties. We generally refer every kind of Acrimony to Saline Matter. of w.t Nature there are y.e Saline Matters of the Blood? We know there are many different kinds of Salts in Chemis.try w.ch are of a simple & Compound Nature. The simple are Acids & Alkalies. Let us first enquire after the Presence of these two in the Blood. Formerly all Diseases were Attributed to One of these, & Remedies were Ordered accordingly to Obviate & Obtund them. Let us attend first to the Acids.

I we Daily take in Acids & acescent Substances in our Aliment. even those Substances

wch are not naturally acescent become so in the Stomach. Notwithstanding this Solution of an Acid from all our Aliment it is always removed in the Process of Chylification. We have no proofs of the Presence of an Acid in any parts of the Body except in the primæ viæ. Let the Degree of the Acid in the Stomach or its Quantity be ever so great, it is always more or less covered before it arrives at the Blood even supposing the Assimilating powers to be ever so weak. It would consume too much time to enquire into the Nature of those Substances wch are supposed to give the sweet Acid Aliment, or to treat of those Causes wch weaken the Force of the Assimilating

Poisons. But w.t shall we say to the Mineral Acids? - they act as Poisons, & therefore do not come immediately under our notice here. w.t Diseases arise from the Acid in the Primæ viæ? is evolved from our Aliment? they are 1st the Heart Burn. 2nd the Morsus ventriculi 3rd Pica & sometimes Bulimia. there are other Diseases arising from it, such as the Feelings w.ch are peculiar to Gouty Persons. all these Affections do certainly depend upon the Presence of an Acid in the Stomach & are greatly influenced in their violence by the Degree & Quantity of this Acid. But there Other more considerable Affections

as "It may be a subject of Inquiry whether these Diseases of the Bowels depend upon the Liver, acting simply upon ye Bowels, or upon its not being sufficiently neutralized by the Bile, or Lastly upon fixed Air evolved from the Aliment during ye further progress of Fermentation of ye Aliment in the Guts" —

w: arise from the circumstances of fermentation in the primæ viæ viz: from the extrication of the phlogistic air w: action the nerves of the stomach, & thus induces hysteria w: lay the foundation for all those spasms & irregular motions w: we find the stomach subject to when the Cholera Morbus & many other Diseases of the bowels are more or less induced by this Cause. The bile of the stomach altho' it shd escape unchanged thro' ye Duodenum from the action of the Bile, yet it produces Diseases only in the Intestinal Canal such as Dyarrhea Gripes - wind &c. I admit thus the Acid action in Diseases of the Intestinal Canal. But does it go further? I answer

we have no proofs of it in the Lacteals or Mass of Blood. It may be present Materially Here is involved & covered in such a Manner as to shew none of its Effects, But I deny Our having the least Reason to suppose it is Formally present there. This I infer 1st from its seldom or never appearing in the Intestines after the Effusion of Bile & pancreatic Juice to the Aliment: 2d w: we may add the dilating power of the Lymph w: mixes w: the Chyle in the Lacteals. 2nd from the Nature of the assimilating powers in the Blood. These are very extraordinary & surprizing. hence we find fixed Alkali changed into volatile, & all Aliment yields an Air which we shall

day hereafter enters more or less into the Composition of the Blood.

3 from all our Humors tending to Putrefaction wch effectually obviates the Consequence of an Acid in the Blood. But wt shall we say to the Milk which yields an Acid as soon as it comes from ye Breast? — this Acid is the Consequence of Fermentation, & never exists formally in the Blood, nor do we know any thing yt can decompose it in the Body. Besides previous to its evolving its Acid it requires all those Circumstances wch are necessary to Fermentation, such as Heat Air &c. Even supposing that it really existed in the Chyle formally, yet it is always

so covered as never to show any of its Effects. but I cannot admit its ever being formally present in the Crude. I conclude therefore that no such thing as an Acid Humor ever prevails in our Blood notwithstanding it has been maintained by men of such Considerable Character as Dr Boerhaave & Dr Gaubius. the Diseases attributed to an Acid in the Blood by both these Authors may be accounted for upon more simple Principles. I acknowledge however that Mineral Acid may some times be present in the Blood if taken by Acid cent into the Body, for we know of no power in the System capable of changing it.

I acknowledge likewise that vegetable acid enters into the Composition of animal Matters. Now this acid may sometimes be in an Over-proportion to the other Matters it unites with, from an excess in the Quantity of vegetable or putrescent aliment. I allow it therefore a possible Case that there may be a morbid acidity in the System from this cause, but I deny our having any proofs of its being formally present in it. I even doubt whether particular aliment such as Animal or vegetable have any Tendency to produce an Over-proportion of acid acid, or any Decomposition of the Animal Fluids, notwithstanding so much has been wrote & said upon this subject.

IV: Let us next enquire into the Presence of a fixed Alkali in the Blood. This not-
-withstand: all the Disputes concerning its Origin is a Product of Nature but Fire is always near or left, ~~for the purpose~~ nurpose to extract it.
- Now we know of no powers in the Body capable of evolving a fixed Alka-
-li from Our Fluids altho' it may be pre-
sent there in a compound state within these 30 years Alkaline Medicines have been taken in Great Quantities as Lithon-
-trochics & these have been supposed to produce an Alkaline Acrimony in the Blood. Dr. Cox Hare is principal Author who maintains this Doc-

= trine I grant it is hard to refuse Facts but when they are solitary I think we may be sceptical w: th Regard to them. - if Alkaline Salts ever reach the Bladder so as to dissolve Stones there, we might in= fer their Presence in the Blood, but it is very doubtful whether these Salts ever reach the Urinary passages so as to pro= duce any dissolving Effects there. The same Relief w: Alkaline Salts give in Cases of Stone may be Obtained from Medicines w: have no dissolving powers. Even Sulph= ur they did dissolve the Stone in y: Bladder yet still I would rather Sulphur they were accumulated in the Bladder, & did not enter

into Mixture wth the Blood. The Alk. salts taken in Lime water is very small, & are generally washed off by the water taken wth them. But further all Alkaline substances in common wth Liquids are more or less destroyed by their Diffusion in the Primæ Viæ, & by mixing wth the Liquid of ye Stomach. Some tell us the Urine has yielded marks of a fixed Alkali, but I deny ye Fact. I grant it contains a volatile Alkali & this, it is highly probable has been mistaken for a fixed Alkali.

But from whence does the diffused state of the Blood arise Dr Kirkham speaks so much off? — But here we must complain that Dr Kirkham has neglected

to inform us of the precise Appearance of the Blood. & in what manner it differs from the Blood of Scorbutic Patients. Besides we may account for the Dissolution of the Blood without supposing the Alkaline Salts acting upon them. all Alkaline Salts are neutralized in the Stomach & we shall show by this that neutral ~~Salts~~ Salts have a power of dissolving the Blood. Further by destroying ~~the~~ the Acid of the Stomach they may Abstract something which was absolutely necessary towards forming the Animal Fluids, & hence the dissolved State of the Blood. I believe all the Absorbent Earths would act as powerfully in dissolving the Blood

as Alkaline salts merely by Alterating the due proportion of Acid from our Fluids. — the dissolved Appearance of the Blood in the Gout depends upon the same Cause by an Alteration or want of y: Acid y: usually enters into a composition of our Fluids. I conclude then that no such thing as a fixed Alkali ever exists formally in our Blood.

But have we any proofs of a volatile Alkali in the Blood? we know there are means of changing fixed Alkalies into the volatile by the powers of the System. There are Means too of changing fixed Alkalies into volatile by means of Alcohol. May not the ~~Calc~~ Bile of our Fluids Alterate in the same way? — It appears then

highly probable that volatile Alkalie is always present in Animal Fluids? - But is it ever in a separate state? We generally find it in the form of an Ammoniacal Salt. But may not Putrefaction evolve it? - This is doubtful. - in Cases of Gangrene a volatile Alkali may be evolved, but it is always confined to the parts only; for as soon as the whole Mass of the Fluids is affected w: it, sudden Death is immediately brought on. Dr. Gardiner supposes in § 310 that a volatile Alkalie may be present in the Blood in a separate state. He mentions several Causes w: introduce it there. The 1st is the

(a) and the filaquosa of Ray.

(b) For an Acc.t of the Spiritus Rector &c
Dr. Boerhave's Chemistry.

use of vegetables abounding w. volt. alkalie such as y. Tetradynamia of Linnaeus. (a) But I doubt whether these vegetables contain a volatile alkali in an uncompounded state. But if they do it is in very small quantities. Hence we find their whole Bon or Spiritus Rector dissipated by drying them.

But supposing it present in large quantities the heat of the stomach would immediately destroy it. nor are these kind of vegetables taken in the body in sufficient quantities to afford any quantity of such an alkali.

The plants of the Tetradynamia w. we use most are the Brassica in its various forms & the Turnip. Now each of these contain but little acrimony after they have been

boiled & had their phlegm separated from them — But granting ~~that~~ that ye: enter the Body yet is it of so Stimulat & bo: latile that it soon vomits or purges or if it enters the Blood it immediately flows off by insensible Perspiration. Upon the Whole I conclude there is no ye least Probability of a Volatile Alkali in our Blood from acid Spiritous Liquors taken in. The 2nd Source of this Volatile Alkali w: Dr Sanchius is, ye Volatile Alkalie may be seperated from ye Lemonade Salt of the Blood by means of a fixed Alkali introduced into the Blood, but I deny that wn a fixed Alkali can enter ye Blood

in such a manner as to decompose the Ammoniacal Salt of our Fluids. even supposing the fixed Alkali did evolve a volatile Alkali from the Fluids effused in the Stomach, yet it would soon be discharged by the bowels, or the Stomach, or discharged by vomiting or purging.

Dr. Gaubius speaks of Soaps decomposing the Ammoniac: Salts, but all we said concerning the Impossibility of a fixed Alkali decomposing it applies equally well against the Soap. Nor are Earths capable of decomposing ~~Soa~~ the Ammoniac: Salts of our Fluids, for they never can operate in this way unless assisted by greater Heat than ever prevails in the Animal Body.

a 3rd Cause of volatile Alkali according to Dr Cambiers is the taking in of aromatic Substances wch by encreasing the Circulation of the Blood evolves its Salts more copiously. But they are never taken in such Quantities as to produce such Effects, & even supposing they did I deny that they have any tendency to decompose the ammoniac Salt of our Blood. perhaps they may tend to encrease the Quantity of this Salt.

His 4th Cause of Volatile Alkali is Poisons taken into the Body. I grant some Poisons dispose our Fluids to immediate Putrefaction by wch means a volatile Alkali

may be evolved from the Animal Salts
But when this is the Case, sudden Death
is immediately brot on & the Patient no longer
becomes an Object of Physic. But I
doubt whether the Poisons do induce
this volatile Alkali. I rather suppose
they operate on the Nerves in such a
manner as to induce a sudden Atonia
& w: give Rise to a Putrefaction of our Fluids.
— I infer this from a Practice which
has of late Obtained in France of
curing Persons of the most dreadful
kinds of Poisons by nothing else
but a free use of the vol: Alkali.
Surely then no vol: Alkali can pre-exist
in the Blood in these Cases. —

Let us now enquire what Proportion of Neutral Salts in our Blood. we shall enquire particularly after each of them. — I imagine few of them are unsound in the Body. they are most of them the Products of Art, few of ye: are presented to us by Nature. There is but one of them introduced in such Quantities as to remain in our Blood, except the Ammoniac Salt. Dr. Boerhaave supposed the Common Salt was unchanged by ye powers of the Oeconomy. But I know no Foundation for this Opinion. I grant it may appear in ye urine but in very inconsiderable Quantities. the urine is a

compound Mass abounding wth many Substances wch Chemistry has not yet ascertained. Margraff who has made many experiments on the Urine, yet never found any thing like common salt in it. he found indeed other salts there wch former Chemists mistook for Common Salt. Upon the Whole I think we have no proofs of the Presence of Common Salt in the Blood either from its Causes or Effects. Dr. Gaubius ascribes many Diseases to it which certainly may be deduced wth more propriety from another Cause. — Altho' it is taken in in considerable Quantities yet Nature is ye power of the System that it changes it after it is

received into the Body. Some late Experiments in France teach us that Muriatic Salt may be changed into Nitre. In the same manner I suppose the powers of the System are capable of changing common Salt into ~~Nitrous~~ Ammoniacal Salt. — I say further there is no Salt in our Fluids composed of a fixed Alkali, or of any of the four Acids. The Salt then of our Fluids is of a nature peculiar to itself & appears to be of the Ammoniacal kind. This we proof from such a Salt always appearing in the Urine which we are sure formerly flowed in the Blood Vessels of Animals. It has been called the Essential Salt of Urine, but it may be

(a) This Salt is Common to all Animals
Every Vegetable has a Salt likewise
a Salt peculiar to itself.

(b) When these Obstructions happen very
suddenly they may occasion a predominance
of this Salt in the Blood.

the w: equal propriety called the Essential or native Salt of Animal Fluids. (1) see Dr Gaubius § 316 Who from his accurate Knowledge in Chemistry has pointed out this very Observation. The Predominance therefore of Salts in our Fluids must always be Attributed to an excessive Quantity of this Ammoniacal Salt. This Excess in Quantity may depend upon an Interruption of the Saline Secretions of Urine & Perspiration. but as these alternate so exactly w: the another I imagine no very considerable Disease can arise from this Cause alone. (61) we must therefore call in Other Causes to account for it. Dr Gaubius supposes Acids & Alkalies may

give this Superabundance of Ammoniacal Salts, but we shall soon prove that it depends upon a Want of Acids, instead of an Excess of them. In those Cases where the Ammoniacal Salts of our Blood abound, there is no better Remedy for it than the free use of Acids. Putrefaction we know always evolves a Salt of the Ammoniac kind. Now we know something analogous to Putrefaction is going forward in the Animal Oeconomy. But this Putrefaction always stops at a certain Stage in the Body & w: is occasioned by fresh Aliment especially Aliment of a Vegetable Nature. The Want then of Vegetable Aliment naturally gives Rise to the Generation of

this Ammoniacal Salt. Albumen likewise produces the same Effect, as also all Animal substances w: are advanced any Degree towards Putrefaction. even Animal Food itself may tend to further this Ammoniacal Salt in greater Quantity.

To these Causes of the superabundance of the Ammoniacal Salt in the Blood we may add Saline Matter introduced into the Body more especially Neutral Salts which by the powers of the System are changed into an Ammoniacal Salt. When this Ann: the free Acid of Alkalies may introduce this Salt into the Body by forming a Neutral Salt w: the Acid of

the Stomach. But the most frequent Cause of this ammoniacal Acrimony in our Blood is the use of common salt in ~~too~~ too great Quantities. from this you will easily ~~see~~ see the remote Causes w: wn: conspire in bringing on the Scurvy. viz: Abstinence Perspiration want of Vegetable Food, - the use of Animal Food alone, & the excessive use of Common Salt.

The Presence then of an Ammoniac Salt in too great Quantity constitutes the proximate Cause of the Scurvy. we may likewise understand the Phenomena of dissolved & acrid Blood from w: have been said, as depending entirely upon

the Presence of Ammonia & fixt in ye Serum of the Blood. the Blood of Scorbutic Patients has been said to be in a putrid state, but it wants many Characters to constitute it such, for it is not produced by Fermentation like all other putrid Mixes, nor is the Disease contagious nor it would be was it of a putrid Nature. to this I may add that ye Serum of Scorbutic Patients has been found to be a most powerful Antiseptic - the slow progress of the Disease & the many Symptoms it is attended with, all shew that it is not of a putrid

Nature. I affirm then that the Blood in the Jaundice is not putrid but may have a putrescent Tendency. This State of the Blood has likewise often been called an Alkalescent State, but as I said before we have no proofs of the Presence of an Alkali in any Form in the Blood. This Ammoniac Salt we have been talking off has been mistaken for it. De Gambius ascribes many Diseases to the Alkaline State of the Blood See § 311, but they may all be derived from Other Causes. Nor can I allow that the Blood of Jaundice Patients is in a putrescent State from

the Arguments taken from the Circumstances of Fermentation we before spoke off. the Ammonia Salt of the Blood resists Putrefaction hence the Reason why Scorbutic Patients are never subject to putrid Fevers.

Contagions operate very differently. most of them produce Fever except the two Venereas. all these Contagions are of a putrefactive kind, but very differently modified. Some of them produce a Matter of a peculiar kind such as the Small pox &c Others produce a Matter w.h operate chiefly on the Nervous System only, & Others act ~~serious~~ in

such a manner as to make it hard to tell ~~on~~ whether they operate on ye Fluids or Solids. But how far does the Putrefaction go in our Fluids? — This Question cannot be resolved from our great Ignorance of ye nature of our Fluids & the Nature of Putrefaction, as well as the Modus Operandi of those Medicines which are supposed to act as Antiseptics. I ought here to condescend upon the Morbid Deviations of each of the other Fluids of this body, but as we know so little of their ordinary State in Health, ~~as~~ well as of the Nature of Secretion to say any thing ~~as~~ precise upon this Subject. Dr. Gaubius has

fallen into Errors in treating upon the Diseases of particular Fluids which most of you may easily detect. Thus have I concluded the Pathology of the Fluids considered by themselves.

Relative Diseases of the Blood.

We shall now go on to consider the Relative Diseases of the Fluids.

The Fluids err in Quantity, place & motion.

1st In Quantity we shall consider their Quantity as relative to the Solids & 2nd as to the Arteries which contain them. I shall consider the last only as the first has been hinted at before. The Vessels containing Blood are always full & stretched, hence Blood vessels are larger in the living than in the dead Body. The Blood vessels are flexible & therefore may be more or less stretched.

If the Vessels yield too much an over-
quantity of Blood is produced w.ch gives
Rise to a Disease called a Plethora.
— the Reverse of this has been called
by Lieutaud Anemia.
The Plethora has been much studied
& many Terms applied to it. a greater
quantity of Fluids than is necessary to
give a proper Tension to y.e System is called
by Sauvages "Plethora ad molem", but I
think w.th little propriety, — when it proceeds
so much as to prevent the functions being
performed w.th their usual Ease it is called
by the Ancients "Plethora ad vires", but
we shall take no notice of this as it is

only a higher Degree of "Plethora ad vasa".

But Dr Gaubius makes another Plethora called "Plethora ad Volumen" viz: is when the Quantity of the Blood is not increased but when their Volume is increased either by ye expansive Force of Heat, or by External pressure being taken off. This is sufficiently evinced from a great Number of Experim^ts made in an exausted Receiver. But this Plethora must always be temporary, & can never give a permanent Disease.

Another Species of Plethora has been marked in viz: the Quantity & Volume of the Fluids continue the same but ye Capacity of the Blood Vessels is diminished. This is called "Plethora ad Spatium". This cannot

act universally in the System, so ye ye Effects of this Statica of Plethora will only appear in particular portions of the System - the Plethora wch follows amputated Limbs may be reduced to the "Plethora ad Spatium"

We shall begin by considering the Plethora ad vasa or Plethora vera wch is an increased Quantity of Blood wth Regard to the sanguiferous System. We are daily taking in $\frac{1}{24}$ of the weight of ~~the entire~~ our Body in Aliment. now if this was not immediately thrown out the Quantity of Fluids would soon be increased as to induce violent Diseases, but there is generally a due Ballance kept up between the Ingesta

(as There must be an Increase of ye power of the Heart wd: Regard to ye Resistances, & as the Blood is not absolutely confined, but allow the Blood to pass off further there must be a kind of Ballance between the Excretories. Veins. Emulgentes & the Great Lymphs and Heart. If a ready passage was allowed into the Veins the Arterious System wd: never be dilated & expanded. We have many proofs of the Density of the Veins being greater in the Begin: of Life than that of the Arteries, & the Resistance of the Arteries has also the same Effect. It is easy to see that these are greatest at

& Secreta, if this is destroyed a Plethora will naturally succeed. The System itself is at particular times disposed to this Inequality between the Ingesta & Secreta. I formerly explained that an accumulation of Fluids was necessary to the Growth of the Body. This accumulation happens only in ye Arterious System. The Sanguiferous System acts upon & is acted upon. as before the Body arrives at its Acme all Plethoras are Arterious some time after that period they become venous. Unless this Intermediate Accumulation takes place in the Veins Obesity follows hence the Reason why people grow fat most in middle age. The Balance of the System will vary in at some

first, & that the Balance will be con-
stantly changing as the parts are stretch
& the Dilation will always be in those
parts of the Arterious System wch are most
distant from the Heart as being weaker
otherwise the Force of the Heart & large
Arteries would constantly tend to encrease
in proportion. So long as ye difference
is considerable the Irregularities have lit
Effect, but at the same time is a kind of
Plethora ad Fratrem, & the Effect of the
Injection must depend all along on the
Balance of the being & Reaction of the
~~Arteries~~ Lacteriors. As the Lacteriors
are first opened we may suppose they require
resisting Force, & so we find ~~they~~ do. the

2nd Manhood wch is about 36 3rd an intermediate state from 36 to 50 during wch time Menstruation ceases in women, 4th From 50 upwards.

The Occasional Causes of Plethora then are 1st a larger proportion of Aliment joined wth stronger Chylopoetic Organs than excretory Defects.

2nd Aliment will always induce Plethora as it is more nourishing & less perspirable

3rd Aliment the being given Plethora will depend upon Exercise, for the less of this is used the less the Secretions are & greater the Accumulation.

4th Cold wch may act in producing Plethora

by diminishing the Secretions especially Perspiration. These then are the most commonly marked Causes of Plethora but we must add to them.

5.th Evacuations. How do these operate so as to induce a Plethora? — The Evacuation I refer to here is Artificial Blood-letting. — Nothing we know disposes more to the Plethoric State than this. Small Bloodletting does not produce Plethora so much as copious Blood Letting from the Disposition of the Solids to contract themselves. But Dr Cullen has pushed this Method of Reasoning too far. If we take a String of 10 Inches long, & stretch it one Inch by a weight appended for several days, this String will not contract

it all to its former Length at least for a considerable time. Thus it is w.y. tribes of our bufs. if the stretching powers are taken off gradually from the solids they soon accommodate themselves to the Fluids, but if the Tension is suddenly taken off it is impossible for them to contract. hence a Laxity is induced. in Consequence then of Blood-Letting the Flexibility of y.e Arteries is encreased while the Secretions continue the time, by this means a Plethora is induced. It is owing to this that y.e Loss of Blood is so soon repaired by y.e System. — The Secretions by means of Blood-Letting require an encreased Contraction which tends still further to produce the Plethoric State. By w.h Marks do we judge of the

Plethoric State? for an apparent Plumpness & Fulness of the Body. but this is ambiguous as it may depend upon Fluids accumulated in the Cellular Texture, hence Obesity & Plethora are often confounded especially as they are always more or less connected wth each other & depend upon the same Occasional Causes. Obesity itself may increase Plethora especially that Species of it wch we called "Plethora ad Spatium".

I find it therefore very difficult to distinguish between Obesity & Plethora. we are apt to think Oily Aliment conduces towards Obesity but we have few or no proofs of this. many fat People live but little on Oily Substances & many lean People live

on an oily Aliment Alone. Do not assimilating powers prevent the Evolution of these oily parts of our Aliment? - or may not the Organs w.h secrete this oily Matter be more or less disposed to evolve it? but we know so little of this subject that we can say but little certain upon it. I formerly said <u>bile</u> tend to mix to the Oil & water of our Aliment. May not an over proportion of this bile prevent the Evolution of this Oil. & may not an over proportion of Animal Food tend to produce Obesity by evolving — by its great Tendency to Putrefaction oily as well as saline Matters. I deliver these things merely as Conjectures.

But we shall seek for Other Causes of Obesity or the Extreme of it. Exercise we know prevents Obesity either by preventing the Evolution of Oil, or absorbing it as soon as it is evolved. The first is most probable, as we find Exercise tends to encrease the Excretions wch prevent Fatness. Excretions tend to prevent Obesity hence Nurses & Milch Cows can never be fattened while they give suck. Other Evacuations as well as this operate in the same way. I have seen Obesity follow a Fever being healed upon. There is then a Balance between the increased Secretion of Oil & the Excretion

it, hence then you see the Reason why Obesity & Plethora are connected with one another as they evidently depend upon the same Causes. But this is not enough on this subject. we often see lean meagre persons grow plump & fat between 30 & 40. at this Period the Arterial Plethora is taken off. It must then arise from the Vacuolar of the Secretions & Venous System being destroyed. It appears then that the Disposition to Obesity as well as to Plethora depend upon the same ~~com~~ State of the System. we may therefore take Measures to remove Obesity as well as Plethora, but it ought be attempted very cautiously. I have known Ladies throw

of this Dinner every day - purge themselves & drink Vinegar to bring down their Fatt, but in all these Cases it lies on many Diseases. The Circumstances of Exercise then are only to be depended on in taking down Obesity, but this should be used w: the utmost Caution. The Vinegar & Soap have been used w: the success to remove Obesity: But these directly operate in a way contrary means: one the Cure causes & the Other destroys the bind of the System. how shall we reconcile this w: what we said before?

Let us enquire into the contrary Relative Diseases of the blood.

1st Inopia Sanguinis, or a simple want of blood in the blood vessels. This may depend 1st upon immoderate evacuations 2d: a want of aliment. - a diminished state of the secretions generally follows a want of aliment, ~~but~~ & therefore the balance wd: still be kept up between the Fluids & Solids. by a want of Aliment then I mean an Abstraction of it either by a vomit - or Diarrhea or Obstructed Lacteals after it is taken in. 3d: upon imperfect Assimilation. or blood of such a Nature as to pass off at once by Urine or Perspiration. I shall point

But one Case of want of Assimilation in wh. Case there is a want of red Globules wh. we know from ye Paleness of ye Surface of the Body as well as Other Phænomena, especially by the Secretions being increased i.e. by the Fluids running off by every Secretion. Dissections have likewise pointed out this Part of the System. Lieut.^d in Particular has no Notice of it under the Title of Anæmia. What are ye Causes of this 1st The want of that Element wh. constitutes the red Globules. 2nd the Defect of those Powers in the System wh. form the red Globules 3rd Evacuations ~~from~~ of Red Blood. These two last Causes seem chiefly to Operate in inducing Anæmia. I dont know wh. to say to the want of Element, or to ye Nature of it.

the Bull & the Lion have an Equal Quantity of Red Globules in their Blood, as also the Peasant who lives on Oatmeal, and the rich Citizen who lives only on Animal Food. the powers of Assimilation then I suspect are chiefly defective & the principal Cause of a Deficiency of Blood. hence we find the Chlorosis always succeeds a weakness of the Chylopoetic Organs. the Consequences of this Anemia are a want of Tension which induces a general Debility in the System. And if we admit the use we formerly assigned to the Red Globules viz to retain the more fluid parts of the Blood, the want of Red Globules will naturally

tend to suffer the more fluid parts of the Blood to escape thro' the numerous patent Vessels w^h. abound all over the System. to prevent this Disease I believe the Red Glo=:bules are always in a very large proportion in growing Animals. When they are dimi:nished the Fluids run off thro' every Emunctory either internally or externally producing fe=:rous Discharges or Dropsies - hence the Rea=:son why Dropsies so often succeed Ha=:morrhages. How far may the want of Coagulable Lymph tend to bring on this Anemia? this Subject I formerly said was deeply involved in Obscurity, & I shall therefore pass it over. I shall only

Observe that this Anæmia always tends to bring on a want of Tension & Debility in the System more especially of the Stomach & Chylopoetic Organs. It Appears likewise in the Brain. Lieut. Lieutaud & Morgagni tell us that they always found the Inopia Sanguinis prevail most in the Brain, & instead of Blood they generally found Air in ye Blood-Vessels which detaches itself from ye Ordinary being taken off. Before it was used to, this want of Tension in the Brain disposes greatly to Lycope. Deliquium Animi &c.

I go on to speak of the Causes of Emaciation. this may depend 1st upon a want of Aliment & 2nd upon too great Secretions. in general I think it depends upon an Absorption of that ~~the~~ matter which occasions Fatness or Obesity which may be occasioned by an Curious ing introduced into the System.
2nd upon too great Muscular Motion
3rd Force and Circulation of the Fluids &
4th too great Secretion of some of the Fluids of the Body especially Milk or Bile. I deliver these things as simple Facts, nor do I think they stand in need of any Proofs. —

We come now to speak of the Motus vitia. The Motion of our Fluids is intestine and progressive. As to ye first big Intestine we are sure it takes place both Mechanic & Chemical. The Mechanical depends upon external Impulse. The Chemical upon the Action of ye Fluids upon One another. The Mechanic Motion never changes the Chemical Qualities of the Fluids, nor has it any Effect only as it influences the Chemical Motion of the Fluids. The Chemical Motion may depend either on Mixture or Fermentation. in both

Cases it consists in Resolution & Combination in w.: Manner these Operate we cannot tell. All we can say is y.: there are such powers in our System but we are entirely ignorant of their modus Operandi. See Dr. Gaubius §407 upon this subject. The Action of the Solids & grant governs the Mixture of the Fluids but there are Operations in them w.: are quite independant of the Mechan.: Action of the System.

What is the Progressive Motion of our Fluids? It generally depends upon the Action of the Solids w.: are capable of

being excited by various powers acting directly or indirectly upon them. These exciting powers are mostly Stimuli, or Sedatives &c: last sometimes indeed excite the action of the Solids. this must depend upon their acting in such a manner on the Sensorium so as to produce a Reaction of it upon the System & thus excite all the moving powers of the System. Tis however the first kind of Stimulus that most of Pathologists refer to I mean such as act directly upon the moving powers. - notwithstanding this the great progressive Motion of our Fluids depends

upon Stimuli that act Indirectly upon the System. Dr Boerhaave in § 586 of his Aphorisms imagine Fever depends upon direct Stimuli. But in this he is certainly wrong which I could prove at some length was this a convenient place. Upon I reduce the Causes of Fever to 4. 1 Cold, 2 Fear, 3 Contagion & 4 a Resistance in the Sanguiferous System. all these weaken the Action of the Heart, in such a Manner as to excite the Reaction of the Sensorium to overcome the Resistance induced by the Causes before said.

On what does a slower Motion of the

Fluids depend? on a diminished
Action of the Solids alone, not depending
on Obstruction for I do not think this
can occasion a slower Motion of the
Fluids, much less do I imagine a
Lentor or Viscidity of the Fluids is capable
of producing such Effects.

on what does an increased Motion
of the Fluids in particular parts of y^e Body
depend? 1st upon an Inequality of y^e
Blood's Distribution from the greater Vicinity
or Distance of parts from the Heart
or from their more Oblique or direct
situation. 'tis upon this Reason

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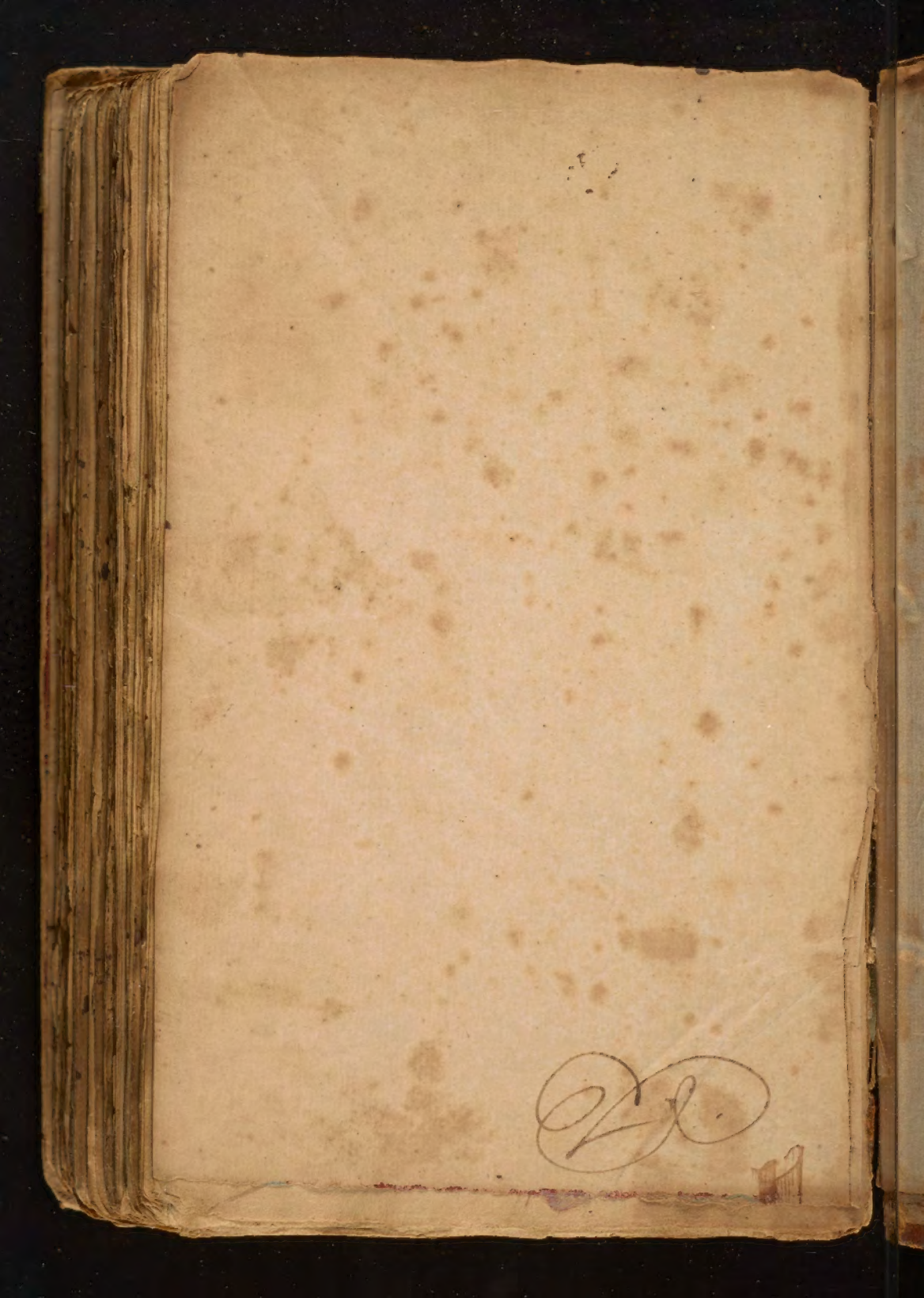

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